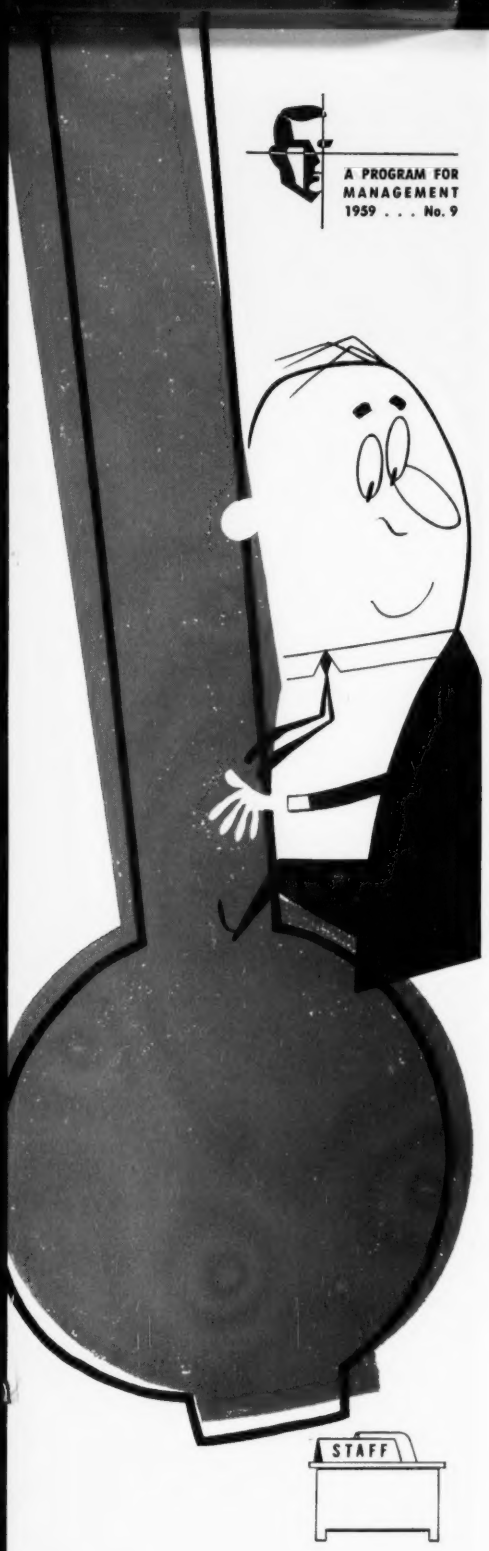
A PROGRAM FOR MANAGEMENT 1959 . . . No. 9

OCTOBER 12, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Drive to Reform 'Buy American' Act May Be Big Industrial Issue in 1960

How to Stop Personnel Cost Leaks

Aluminum Brazing Paste Saves $175,000 in Airframe Assembly

Tape Speeds Turret Punching

Aircraft Producers Report on Castings, Nonmetals, Extrusions

Steel Extruders Hunt New Markets

Management In Transition

PAGE 101

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TURN PAGE

METALWORKING OUTLOOK
PAGE 49

Metal Show • Booth 528
International Amphitheatre
Chicago • November 2-6

YOU CAN CUT INVENTORY INVESTMENT OF MECHANICAL TUBING

If you depend on B&W and your local Steel Service Center . . . because:

. . your local Steel Service Center maintains large and diversified mechanical tubing stocks, available to you for immediate delivery

. . . your local Steel Service Center can help you cut handling and storage costs and maintain production continuity

And when it comes to mechanical tubing, ask for B&W Job-Matched Tubing. For information on how this tubing can reduce your production costs call the local B&W District Sales Office or write for Bulletin TB-352. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

AMERICAN STEEL WAREHOUSE ASS'N

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9000-SMI

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

This Week in STEEL

the Metalworking Weekly

October 12, 1959 Vol. 145–No. 15

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Metalworking Pulse ▸

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED OCT. 3	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	115† †Preliminary.	114	109	139

Both auto production and railroad freight carloadings have been moving up in the last three weeks, resulting in small weekly advances in STEEL's industrial production index. But the steel strike continues to hold it in check for the most part.

Details on Page 79

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED OCT. 10	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	105,000* *Estimated.	103,527† †Preliminary.	24,364	34,834

Labor troubles and steel shortages are preventing the auto industry from meeting its schedules. While some plants are working six days a week, others have been cut back to four to conserve dwindling metal stocks.

Details on Page 76

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED OCT. 11	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	368*	362	327	1,933
Index (1947-49=100)	22.9*	22.5	20.4	120.3
Percentage of capacity	13.0*	12.8	11.5	71.6

*Estimated by STEEL; comparative figures reported by AISI.

Through Oct. 12, the metalworking industry has lost about 25,479,000 ingot tons production. Weekly output has leveled off at some 360,000 tons a week and likely will hold at that figure until mills are reopened.

Details on Page 152

STEEL SCRAP PRICE COMPOSITE

	OCT. 7	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$43.00	$43.00	$40.00	$42.33

The market remains optimistic. An added supporting factor has appeared: Some industrial scrap is being diverted from usual broker channels to mills which are processing it under conversion deals.

Details on Page 164

FINISHED STEEL PRICE INDEX

	OCT. 6	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8 §Revised.	186.8§	186.7	186.7

The Bureau of Labor Statistics has raised its wholesale price index of finished steel mill products, reflecting higher prices posted by some producers of galvanized products. That action in turn reflects higher zinc quotations.

Details on Page 153

III

KNOW YOUR ALLOY STEELS . . .

This is the third of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

What Does Grain Size Mean In An Alloy Steel?

The grain size of alloy steels is generally understood to mean austenite or inherent grain size, as indicated by the McQuaid-Ehn carburizing test. Austenite grain size should be distinguished from ferrite grain size, which is the size of the grains in the as-rolled or as-forged condition with the exception of those steels that are austenitic at room temperature. When steel is heated through the critical range (approximately 1350 to 1600 deg F for most steels, depending on the composition), transformation to austenite takes place. The austenite grains are extremely small when first formed, but grow in size as the temperature above the critical range is increased, and, to a limited extent, as the time is increased. It is apparent, therefore, that both time and temperature must be constant in order to obtain reproducible results.

When temperatures are raised materially above the critical range, different steels show wide variations in grain size, depending on the chemical composition and the deoxidation practice used in making the heat. Heats are customarily deoxidized with aluminum, ferrosilicon, or a combination of deoxidizing elements. Steels using aluminum or other deoxidizers in carefully controlled amounts maintain a slow rate of grain growth at 1700 deg F, while heats finished with other deoxidizers, usually ferrosilicon, develop relatively large austenite grain size at temperatures somewhat below 1700 deg F.

The McQuaid-Ehn test is the one ordinarily used for determining grain size. Steel is rated with a set of eight ASTM charts that are compared one at a time with a specially prepared steel sample until one is found to match. Number 1 grain size, the coarsest, shows 1½ grains per sq in. of steel area examined at 100 diameters magnification. The finest chart is Number 8, which shows 96 or more grains per sq in. at the same magnification.

Properties Affected by Grain Size

Fine-grain steels (grain sizes 5, 6, 7, and 8) do not harden as deeply as coarse-grain steels, and they have less tendency to crack during heat-treatment. Fine-grain steels exhibit greater toughness and shock-resistance—properties that make them suitable for applications involving moving loads and high impact. Practically all alloy steels are produced with fine-grain structures.

Coarse-grain steels exhibit definite machining superiority. For this reason a few parts which are intricately machined are made to coarse-grain practice.

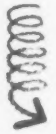
The correct specification and determination of grain structure in steel is a subject that has been given long study by Bethlehem metallurgists. If you would like suggestions on this or any other problem concerning alloy steels, these men will be glad to give you all possible help.

In addition to the entire range of AISI alloy steels, Bethlehem produces special-analysis steels and the full range of carbon grades.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

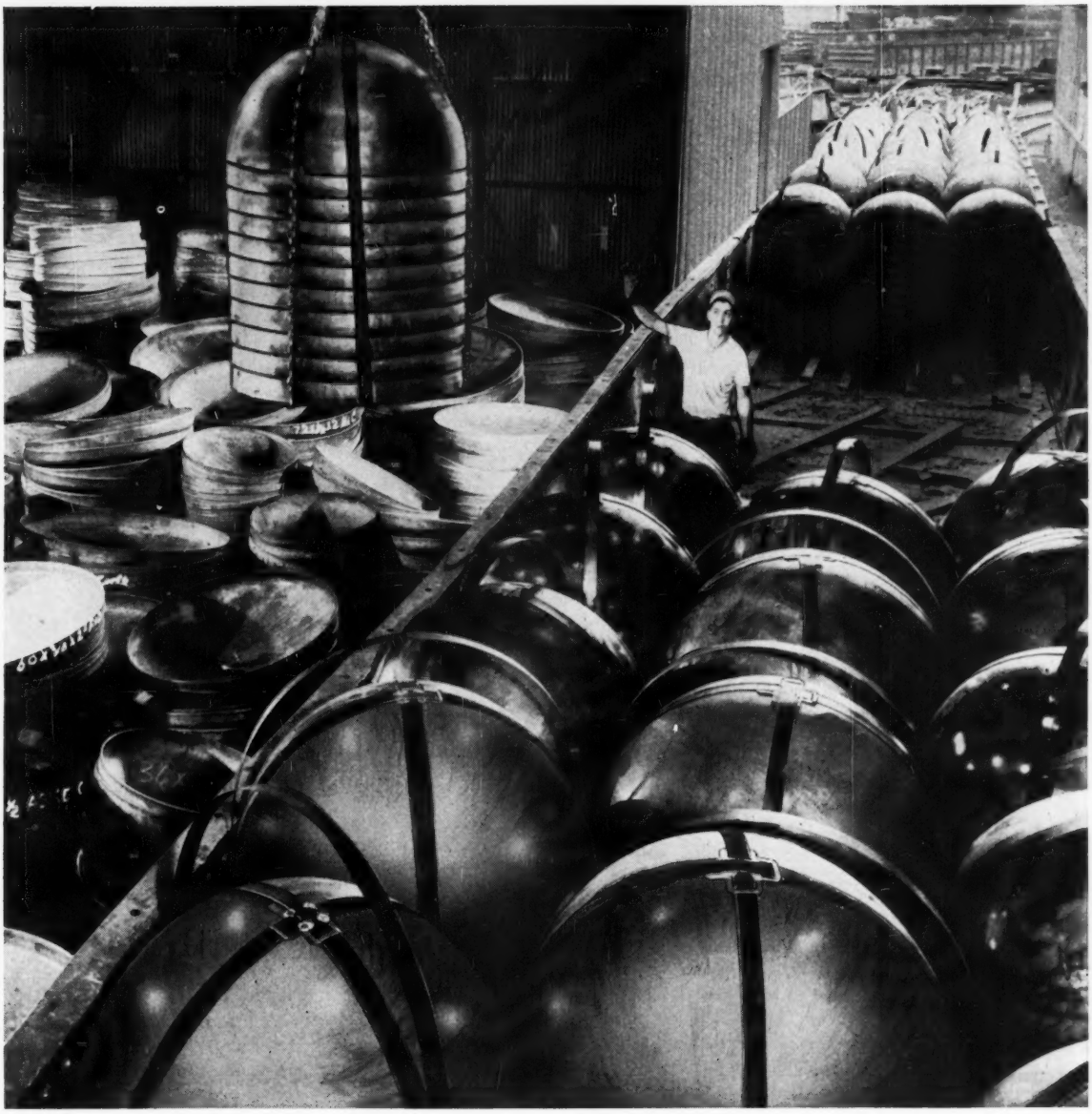
BETHLEHEM STEEL

If it rolls on an axle or turns in a bearing or rides on a shaft
if it slides in a groove or moves on a pivot if it bores  or cuts or transmits pressure
one of Sinclair's 500 specialized lubricants is designed to make it work better.
For answers to your lubrication problems, write today to

SINCLAIR REFINING COMPANY

Technical Service Division
600 Fifth Ave, N.Y. 20 N.Y.

Sinclair



Get fast delivery—order COMMERCIAL heads

COMMERCIAL tank heads, cold formed in steel dies, are more accurate than spun heads, yet actually cost you less. That's because their consistant uniformity makes fitting-up easier . . . welding faster. And, you get this advantage in every size and style—in fact, in every single head . . . just one or a whole carload.

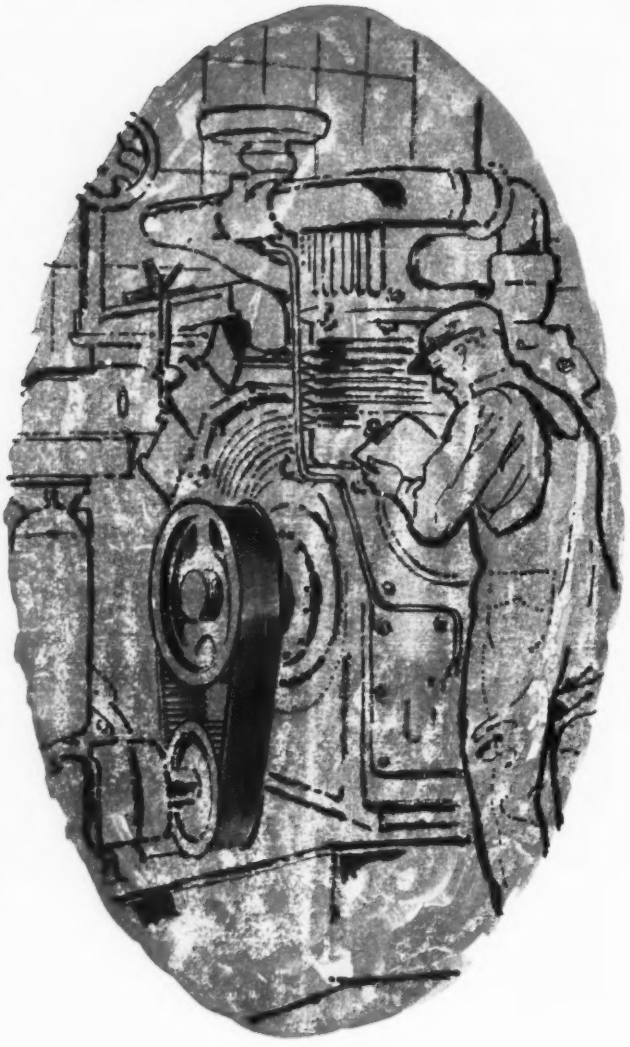
For fast delivery, COMMERCIAL offers heads from stock made with a complete range of solid dies in all standard sizes from 12" to 72" O.D. . . . in all popular gauges up to ½" thickness. Heads can be furnished for code or non-code pressure vessel construction from steels to meet the required specifications. Types furnished include flanged-and-dished, ellipsoidal, hemispherical, flanged only, double dished and obround.

With over 30 years experience and ingenuity in cold forming of steel, COMMERCIAL produces heads with improved metal quality in presses up to 2000-ton capacity. Three plants—Youngstown, Chicago, Salt Lake City—strategically located in important steel producing centers, are keyed to expedite your order.

For full information on heads in stock for immediate delivery, write to Commercial Shearing & Stamping Company, Dept. L-42, Youngstown 1, Ohio.

Specialists in the shape of things to come

COMMERCIAL shearing & stamping



positive drive

BELTS

give you positive power transmission without slip

If you have a problem drive that has defied all efforts at effective, slippage-free belting—here's your answer.

It's the new P. D. (Positive Drive) Belt—from the G.T.M.—Goodyear Technical Man—and his colleagues. And it gives you the near-100% efficiency of a fine gear drive—guaranteed by the extra-quality construction for which Goodyear belts have long been known.

P. D. Belts will not slip—even under high-torque, heavy shock-load conditions. Credit for that belongs to the integrally molded teeth of special Goodyear synthetic rubber compounds —teamed with load-carriers of airplane-type steel cable.

With dimensionally stable construction like this, usually no take-up is necessary. In fact, high tension isn't required—even initially. So bearing loads are lighter—bearing life, longer. And with no metal-to-metal contact, no lubrication is necessary.

So it's easy to see why so many outfits are converting drives to this new, more accurate kind of power transmission. It's the same reason so many present tooth-belt users are scheduling P. D. Belts by Goodyear for their next replacement. They know they can get a reliable recommendation from a real belt expert, the G.T.M.

For complete specs on P. D. Belts for drives up to 600 h.p. and for speeds over 10,000 f.p.m., contact him through your Goodyear Distributor — or by writing Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

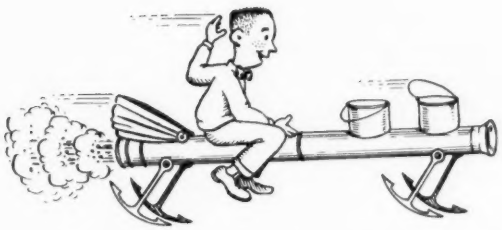
"P. D."—
POSITIVE DRIVE
BELTS BY

GOODYEAR

THE GREATEST NAME IN RUBBER

Goodyear Positive Drive Belts are manufactured under license and according to U. S. Patents 2,507,852 and 2,397,312

P. D.—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



Of Bazookas, Anchors, and Pots

A June bug piled out of his roller skate, ankled up to a 1960 bazooka, opened its bonnet and peered at the pots. He checked the lipstick, tuned up the organ, stoked and banked the furnace, cranked the ragtop, and asked about scorch. He kicked over the Detroit iron's mill, peeled, then dropped the anchors. After he had inquired about the downstroke, it turned out that he was a Be-back.

Those words are Detroitese, says E. M. Braden, general sales manager, Chrysler & Imperial Div., Chrysler Corp., Detroit. The terms are used by autoworkers, salesmen, and engineers in everyday cartalk. Chrysler is publishing a Detroitese dictionary for distribution with 1960 cars, but you don't have to get a copy of the lexicon for a translation of the hep talk in the above vignette. It reads:

A teenager got out of his small sports car, walked up to a 1960 high powered car, opened its hood and peered at the carburetors. He checked the front end treatment, tuned up the radio, turned the heater on and off, lowered the convertible top, and asked about the car's performance potential. The youth started the American made car's engine, rapidly accelerated, then hit the brakes. After he asked about the down payment, he left to get his parents O. K.

Readers Ask for More

The mail boy has been carting in stacks of letters about Associate Editor Ross Whitehead's article, "500,000 psi Steel . . . Ford Leaps the Tensile Barrier," which ran in STEEL's Sept. 21 issue.

Here are some answers for you without the questions: No one knows how much the high strength, ductile metal will cost nor when it will be available commercially. Production of the steel will not be undertaken by Ford Motor Co.—many practical problems have to be worked out before feasibility of the steel as a production item will be known. Perhaps laboratories will turn out initial batches in small quantities. Experimenters are finding new things about Ausforming every day and aren't ready to draw conclusions about how the material reacts in any of the industrial processes.

If you'd like more data on the metallurgical breakthrough, drop a line to Dr. Victor F. Zackay, supervisor of the Physical Metallurgy Section, Scientific Laboratory of the Engineering Staff, Ford Motor Co., Dearborn, Mich.

Here Are Two Look Alikes

The fellow on the left is Michael V. DiSalle, Ohio's governor. The gentleman flanking him is John Pugsley, executive vice president, accounting, U. S. Steel Corp., Pittsburgh.

The resemblance was noted by Assistant Editor Mary Borgerhoff, who handles STEEL's Men of Industry department. Mary had a photo of another metalworking executive who she thought "looked just like the guitar player with Lawrence Welk's bubblemakers." We dissuaded Mary from submitting the picture for comparison; not enough people notice guitarists.

We are interested in photos of look alikes—preferably people from metalworking who resemble prominent figures in government, entertainment, or business. If you know of any, send along your ideas.

Who Pays for Engineering?

That theme has been explored in STEEL's editorials in the last few weeks, and we've had some thoughtful replies.

B. C. Saunders, secretary and sales manager, Gallmeyer & Livingston Co., Grand Rapids, Mich., writes: "We are continually requested to send sales engineers half way across the country to discuss the building of equipment. Time after time, we find that three or four competitors have been asked to do the same thing. Result: Possibly a half dozen of us are spending a thousand or more dollars to render service to a customer. The customer should be more considerate than to ask

R for Moisture-Hungry
Stopper Rod Tile

WALSH
MORT-AIRSET

High Temperature Air-Setting Cement Assures High Moisture Retention . . . Guarantees Stronger, Tougher, Tighter Bond For Stopper Rods

Here's a refractory cement that retains it's original moisture content when applied to "moisture-hungry" tile . . . combines smooth workability with non-shrinking qualities to produce remarkably tight impenetrable joints throughout the complete temperature range to 3000° F.

Try this cement for bonding your stopper rod tile. Note for yourself it's excellent working, drying and non-shrinking properties that deliver easier application, better bond and longer service life. Guaranteed not to "gum up" or form lumps in the drum even after extended periods of storage.

Packed in 500 lb. and 200 lb. drums and smaller steel containers.

Write for literature.

Specialists in Refractories of High Bulk Density and Low Porosity

WALSH
REFRACTORIES
CORPORATION
101 FERRY ST. · ST. LOUIS 7, MO.
FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

several competitive builders to work out their problem for them."

Here's another comment from C. E. Heil, chairman, Heil Process Equipment Corp., Cleveland: ". . . It is one of the evils of competition in the American industrial life. Certainly, it tends to depreciate engineers.

"Lawyers, doctors, dentists, architects, etc., are free of this subtle situation. Much engineering talent is going to waste . . . congratulations for giving this subject prominence."

H. H. Whitmore, executive vice president, Jones & Lamson Machine Co., Springfield, Vt., says: ". . . If the answer to 'Who Pays for Engineering?' is that engineering must be charged to the customer, then in many instances, the users of standard equipment will pay for engineering on special orders which were quoted but which were not placed."

STEEL Covers the Big Eye

Television is invading metalworking via closed circuits. Assistant Editor Derry Eynon has an out-of-the-ordinary story on the big eye in this issue.

One day, while getting the story, he found himself facing a portable camera and viewing his image on a monitor during a demonstration in a distributor's showroom. He self-consciously jingled the change in his pocket, scratched his head, smiled, shuffled his feet, thought fleetingly about doing a fast buck and wing and finally, feeling Big Brother watching, retreated from the all encompassing gaze of the camera.

Derry has decided the TV tube is not for him. He'll stick with his typewriter.

What's Happening in Nickel?

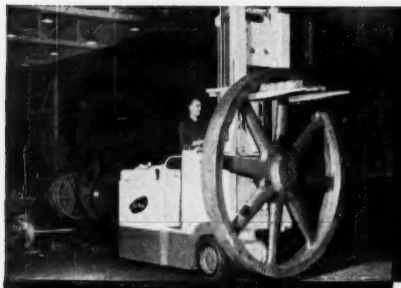
It has been about two years since nickel jumped from a position of scarcity to one of plenty. Producers were suddenly facing an overabundance of metal as stockpile goals began to be met. Markets were shrinking, and there was a traditional lack of promotion and research. At about the same time, producers were bounced around by the recession.

How have producers fared during the last two years? What's ahead for them?

Those questions and many others are the assignment of Associate Editor Brian Wilson, the STEEL staffer who edits our nonferrous department. Next week, check his roundup report on interviews with nickel producers, users, and government officials.

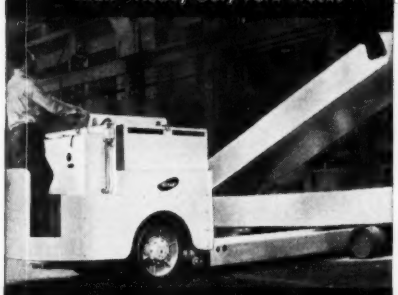
Here's a personal item about Brian. For the second consecutive year, he has been elected to the executive committee of the New York Business Paper Editors Association. He will supervise a training course in writing, layout, and production for people from the 100 member publications and other publications in the New York area.

Get The Facts On
ELPAR LEASING

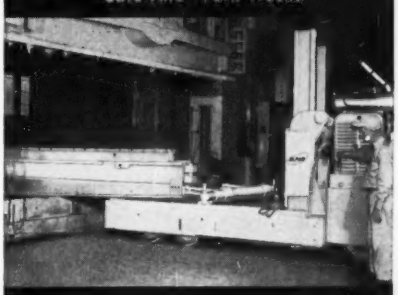


You can use ELPAR Leasing to put one of these cost cutting ELPAR industrial trucks to work in your plant immediately! Do it without a major cash outlay . . . and, pay the low monthly payments out of savings created by the new truck.

"Titan" Heavy Duty Fork Trucks



"Safe-Hite" Fork Trucks



4 Leasing Plans . . . Covering 150 *ELPAR* Models

1 Straight Leasing: The lowest cost form of leasing — payments are made in equal monthly installments for periods up to 5 years. Trucks complete with battery and charger may be leased. Equipment can be released as often as desired after the initial term has expired.

2 Lease With Option To Buy For $1.00: This plan gives you the option to buy the equipment for $1.00 at the termination of the lease.

3 Lease With Option To Buy At Fair Market Value: At the termination of the lease, this plan permits you to buy the equipment at the fair market value. Monthly payments under this plan are lower than the dollar option plan.

4 Fleet Lease: Companies planning to lease a large number of trucks will find this plan attractive and economical. Consult the main office or your local ELPAR man for details.

Low Lift Platform Trucks

Die Handling Trucks

Fork Trucks with Attachments

"Cargo Scout" Fork Trucks

GET THIS FREE FACT BOOKLET . . . it contains an explanation of leasing and rate tables that permit you to estimate leasing costs. Send for it today!

Mobile Cranes

"Air-Right" Fork Trucks

ELPAR
ELECTRIC TRUCKS

THE **ELWELL-PARKER** ELECTRIC COMPANY
4101 ST. CLAIR AVENUE • CLEVELAND 3, OHIO
In Canada: International Equipment Company, Ltd.

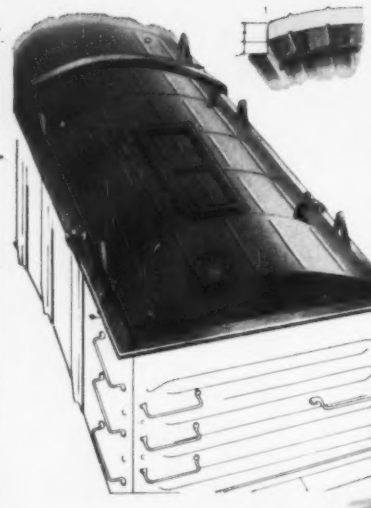
TWICE THE LIFE . . . ONE THIRD THE OPERATING COST

NEW DAMAGE CONTROL DEVICES by

for Railroads and Shippers

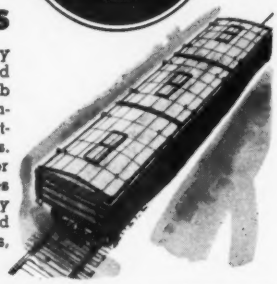
- LOWER SHIPPING COSTS
- CUT DAMAGED SHIPMENTS
- SAVE MAN-HOURS

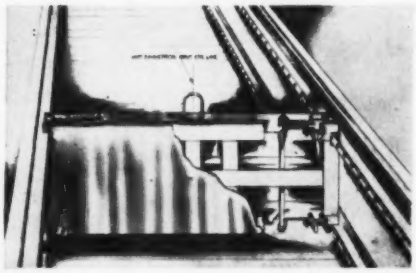
YOCAR

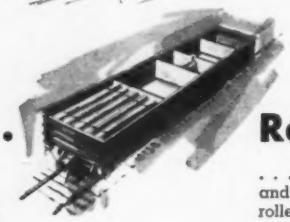


NEW Gondola Roofs

Over-all product costs are important—that's why YOCAR roofs are a must for your road. Beaded steel welded over YOCAR's exclusive web underconstruction insures warp-free performance; extra months of revenue service. Adjustable roof heights meet A.I.S.I. 48" standards. Center section over-laps end sections; greater weather protection for steel bars, sheets, plates and tubing. Roofs are quickly removed by cranes using "C" hooks, slings, chains and even sheet lifters. Manway doors, catwalks, special heights optional.

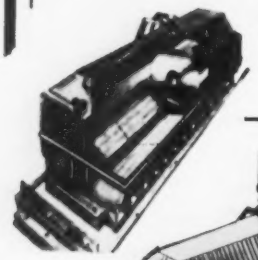


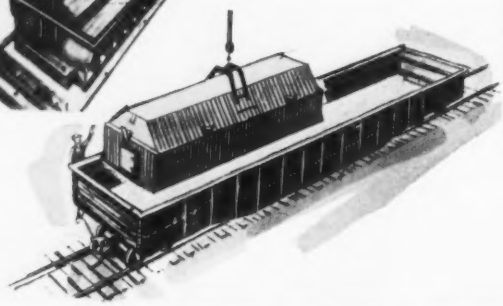




NEW . . RoLLoK Movable Bulkheads

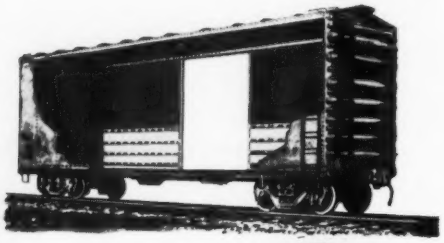
. . . cut installation time in half with new "Zee"-section tracks at top and bottom of car walls; bulkhead positions easily on case-hardened rollers; over-sized locking pins allow for car wall distortion . . . swivel crank operates locking pins quickly and safely. Meets A.I.S.I. standards . . . steel or wood facings available . . . bulkheads are in car sets to meet any requirement.





NEW Gondola Hoods

For your coil shipping needs . . . YOCAR's Hi-Side Hoods to fit all existing skid cars or YOCAR's new Shock-Spring Coil Skid and Low Walled Hood. Features: tighter fits; handles easier, even in low height-clearances; deeper coil well for positive cradling. New cross-member retainer bar locks coils securely for maximum protection.



NEW ECONO-GUARD

. . . low-cost steel anchor-wall liners add years to car wall life . . . provides greater damage protection to shipments with over 200 "Safe-Cargo" anchoring pins. Ask about SAFE-CARGO anchor belt rails for PIGGY-BACK trailers.

SEND FOR NEW CATALOG TODAY!

YOCAR

YOUNGSTOWN STEEL CAR CORP., NILES, OHIO

Electronic parts courtesy Judson Mfg. Co., Inc., Cornwells Heights, Pa.

Mirror-bright without polishing, after switch to Sunicut

Boring on a multiple-spindle automatic produced the finish you see on these electronic parts. Sunicut 102-S Cutting Oil saved time and money by eliminating the polishing operation. The same automatic uses Sunicut 102-S to machine metals ranging from titanium to stainless 410.

Sunicut 102-S is one of a full line of cutting oils known throughout metalworking for maintaining long tool life, close tolerances, and fine finishes. There's a grade of Sunicut that can help you improve your product quality—and *that's* the best economy of all.

To choose the right Sunicut, ask the Sun man; that's part of his service to you. Or write to SUN OIL COMPANY, Dept. S-10, *Philadelphia 3, Pa. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

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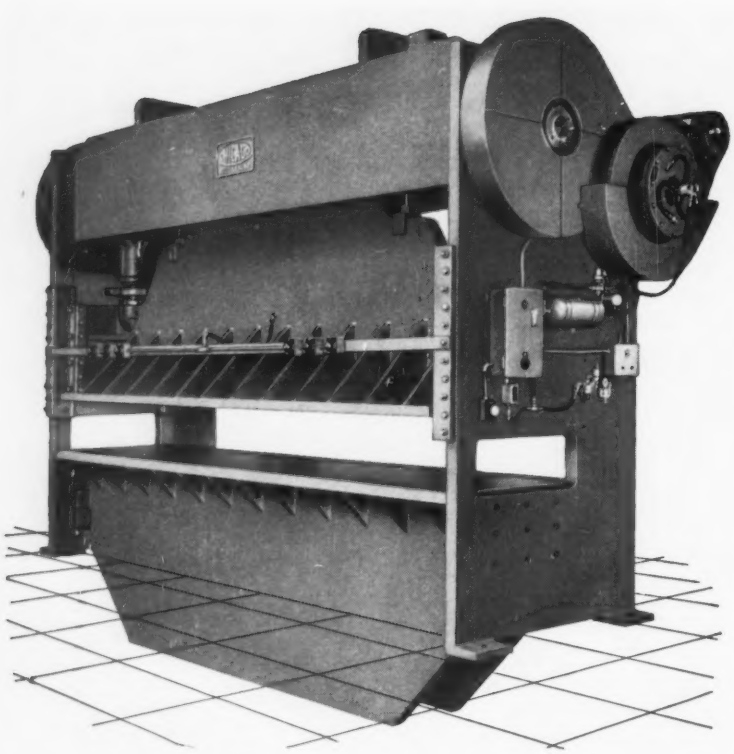
MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES



CHICAGO DREIS & KRUMP

PRESSES
STRAIGHT-SIDE TYPE

large die area
capacities up to 400 tons

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

Complete recommendations for any job on request.

8674

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP
MANUFACTURING CO.
7458 South Loomis Boulevard, Chicago 36, Illinois

CALENDAR
OF MEETINGS

Oct. 15-17, Foundry Equipment Manufacturers Association: Greenbrier Hotel, White Sulphur Springs, W. Va. Association's address: 1 Thomas Circle, Washington 5, D. C. Secretary: C. R. Heller.

Oct. 16-17, American Production & Inventory Control Society: Annual technical conference and exhibit, Hotel New Yorker, New York. Information: A. V. Santora, convention chairman, Revere Corp. of America, Wallingford, Conn.

Oct. 18-21, Air Moving & Conditioning Association: Annual meeting, Ponte Vedra Club, Ponte Vedra Beach, Fla. Association's address: 2159 Guardian Bldg., Detroit 26, Mich. Executive director: Marshall F. Allen.

Oct. 18-22, Electrochemical Society Inc.: Fall meeting, Deshler-Hilton Hotel, Columbus, Ohio. Society's address: 1860 Broadway, New York 23, N. Y. Executive secretary: Robert K. Shannon.

Oct. 18-24, American Trucking Associations Inc.: Annual meeting, Statler-Hilton and Biltmore Hotels, Los Angeles. Association's address: 1424 16th St. N.W., Washington 6, D. C. General manager: R. G. Atherton.

Oct. 19-20, American Coke & Coal Chemicals Institute: Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 711 14th St. N.W., Washington 5, D. C. Executive secretary: Bernard M. Fitzgerald.

Oct. 19-20, Magnesium Association: Annual meeting and exhibit, Roosevelt Hotel, New York. Association's address: 122 E. 42nd St., New York 17, N. Y. Executive secretary: Jerry Singleton.

Oct. 19-21, American Society of Lubrication Engineers and American Society of Mechanical Engineers: Joint lubrication conference, Sheraton-McAlpin Hotel, New York. Information: ASLE, 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: Calvert L. Willey.

Oct. 19-23, American Society of Civil Engineers: Annual convention, Hotel Statler-Hilton, Washington. Society's address: 33 W. 39th St., New York 18, N. Y. Executive secretary: William H. Wisely.

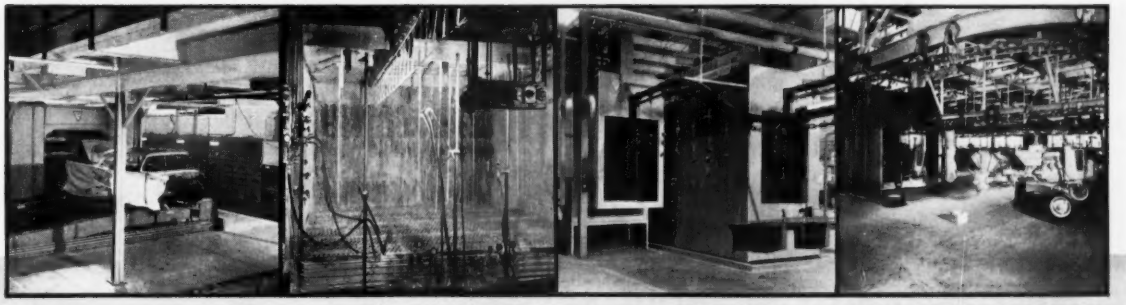
Oct. 20-22, American Standards Association: National conference on standards, Sheraton-Cadillac Hotel, Detroit. Association's address: 70 E. 45th St., New York 17, N. Y. Managing director: G. F. Hussey Jr.

Oct. 21-24, National Management Association: Annual meeting, Statler-Hilton Hotel, Detroit. Association's address: 333 W. First St., Dayton 2, Ohio. Executive vice president: Marion Kershner.

From hair pins to rockets

Look into production savings possible with automatic

DESPATCH FINISHING SYSTEMS



Control panel along wall controls material flow through washing, rinsing, chromic acid treatment, finish coating on metal and finish baking.

Electro-static spray booth in finishing department of refrigerator manufacturer. Completely automatic control.

Small 3 stage washer and dry-off oven prepares small parts with maximum automation.

Finish Bake Oven in modern tractor plant shows programing of all components to expedite assembly at exit of Despatch baking oven.

When competition forces your prices down and you are casting around for a way to save your customers without losing your profit . . . look into your finishing department. For 20 years new synthetics have been altering requirements in finishing equipment. In more recent times new material handling methods have introduced new ways to organize finishing production to lower handling costs.

Through this finish production revolution, Despatch Engineers have maintained close contact with leading chemical research and development organizations. Our engineers have collaborated with basic metal manufacturers and finish coatings producers to develop processes in wide use today. Many of these developments are protected by Despatch patents.

Our 50 years in building heat processing equipment for American industry provide a dependable background for the latest scientific applications of automation in finishing systems. You will find our experience helpful in solving your problems of material handling, washing, chromic acid treatment, finish coatings, drying and baking of any product.

You will find our engineers resourceful in applying their information to improving your finishes and cutting your production costs.

Write today for a resident engineer or request bulletin No. 51

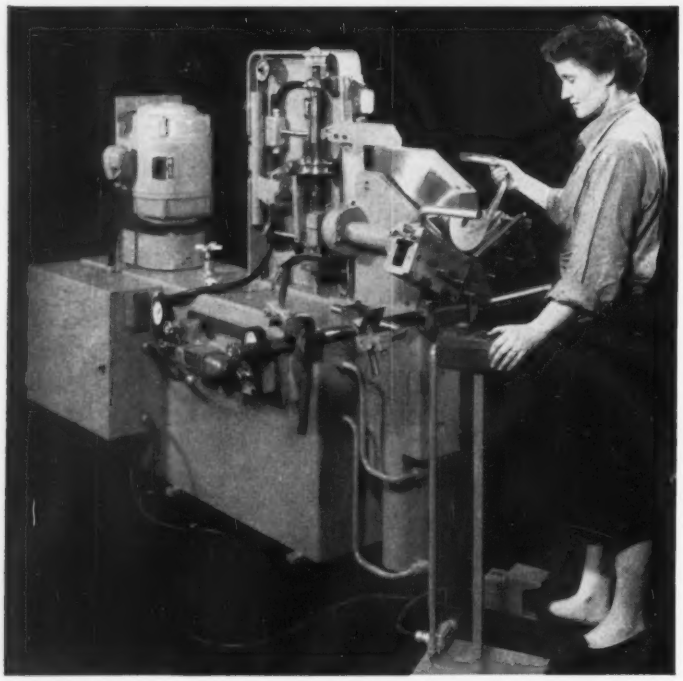
DESPATCH OVEN CO.

DESPATCH OVEN COMPANY

619 S. E. 8th Street • Minneapolis, Minn.

NEW PINES 3T PRESS

Cuts Bending Costs AS MUCH AS 50%



COMPLETE LINE OF BENDING PRESSES

In addition to the Model 3-T, Pines also builds the larger bending presses, illustrated below, which are also establishing outstanding performance records.

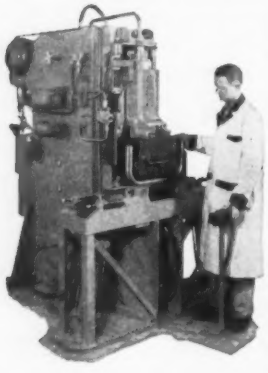
Makes Bends Progressively to Varied Angles In Multiple Planes 2 to 3 Times Faster

Quality bends at production speeds that are 2 to 3 times faster than conventional methods, are now possible with the new Pines 3-T Bending Press. Many tubular parts in sizes up to 1" O.D. are now formed at net speeds of over 1000 bends an hour. Up to 9 different bend angles can be produced in a single setup. Adjustable automatic indexing stops accurately control depth of ram stroke. Open tooling area permits rapid progressive bending in varied planes.

Wing Die Design Assures Quality Bends

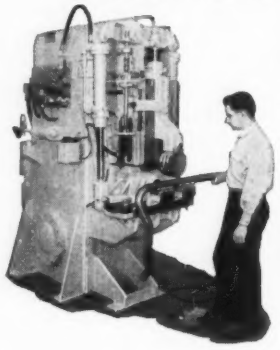
High production speed is just part of the story. Unusually smooth, good looking bends are produced to meet the quality demands of automotive, furniture, toy, office equipment, and appliance manufacturers. Wing dies of the press are designed to move in ways as a bend is made, and their pivoting action is hydraulically cushioned through bearing-mounted rocker arms. This principle eliminates scratches or draw marks and produces wrinkle-free bends with very little distortion. Get the complete story on cost cutting advantages of this new Bending Press today.

MODEL 6T FOR MULTIPLE U-FRAME BENDING



Makes two bends of the same or slightly different angles in each of two or more tubes simultaneously. Production of four or more bends with each stroke makes it possible to form 1700 to 3000 bends per hour in tube sizes ranging up to 1" O.D. x .065". When necessary, retractable ram dies are used to release pieces from die grooves. Like 3-T, wing dies move with work, eliminating draw marks, producing bends of superior quality.

MODEL 1900 FOR PROGRESSIVE BENDING OF TUBES UP TO 2" O.D.



Designed for high speed bending of parts requiring a variety of bends in different planes, such as automotive exhaust and tail-pipes, or similar work. Major features are automatic angle indexing and greater working clearance which permits completing, for example, 90% of all bends in a tail-pipe with a single tooling setup. Press handles stock sizes up to 2" O.D.

PINES ENGINEERING CO., INC.

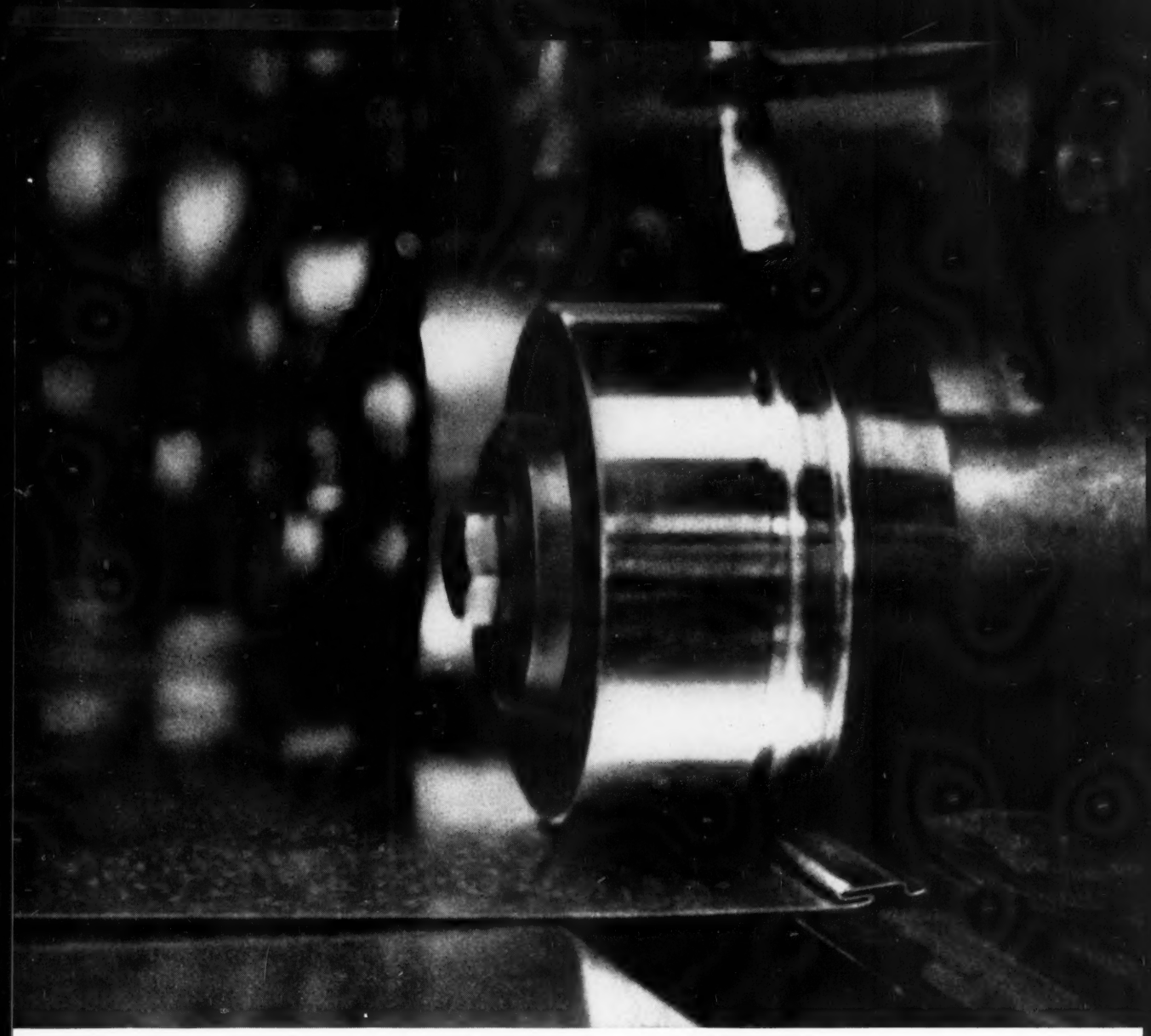
Specialists in Tube Fabricating Machinery

663 WALNUT • AURORA, ILLINOIS

WRITE FOR *FREE* DATA SHEETS

To keep abreast with bending, write for free copies of "Pines News"—get latest data on rotary and press-type machines, and up to date information on tooling.

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY



"LOCK SEAMS GIVE US TROUBLE? NO SIR—WE USE WEIRKOTE®!"

When it comes to the rigors of lock-seaming, nothing can take it like Weirkote.

Why? Because Weirkote combines the strength of steel with a tightly bonded continuous process zinc coating that remains intact through the severest fabricating steps. No chipping. No peeling. In fact, Weirkote can be worked to the very limits of the steel itself and still come through with a smooth, even, corrosion-resistant zinc coating on both sides of every crease.

So whether your product is crimped or drawn, spun or twisted, Weirkote means a new high in production results, corrosion prevention and customer goodwill—a new low in costly, worrisome rejects.

Weirkote's low initial price, combined with these production savings, insures the economical quality you may have been looking for. Why not investigate further by sending for the 12-page Weirkote booklet that explains how Weirkote can help you both in your products and in your production. Just write to Weirton Steel Company, Dept. B-13, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

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NATIONAL STEEL CORPORATION

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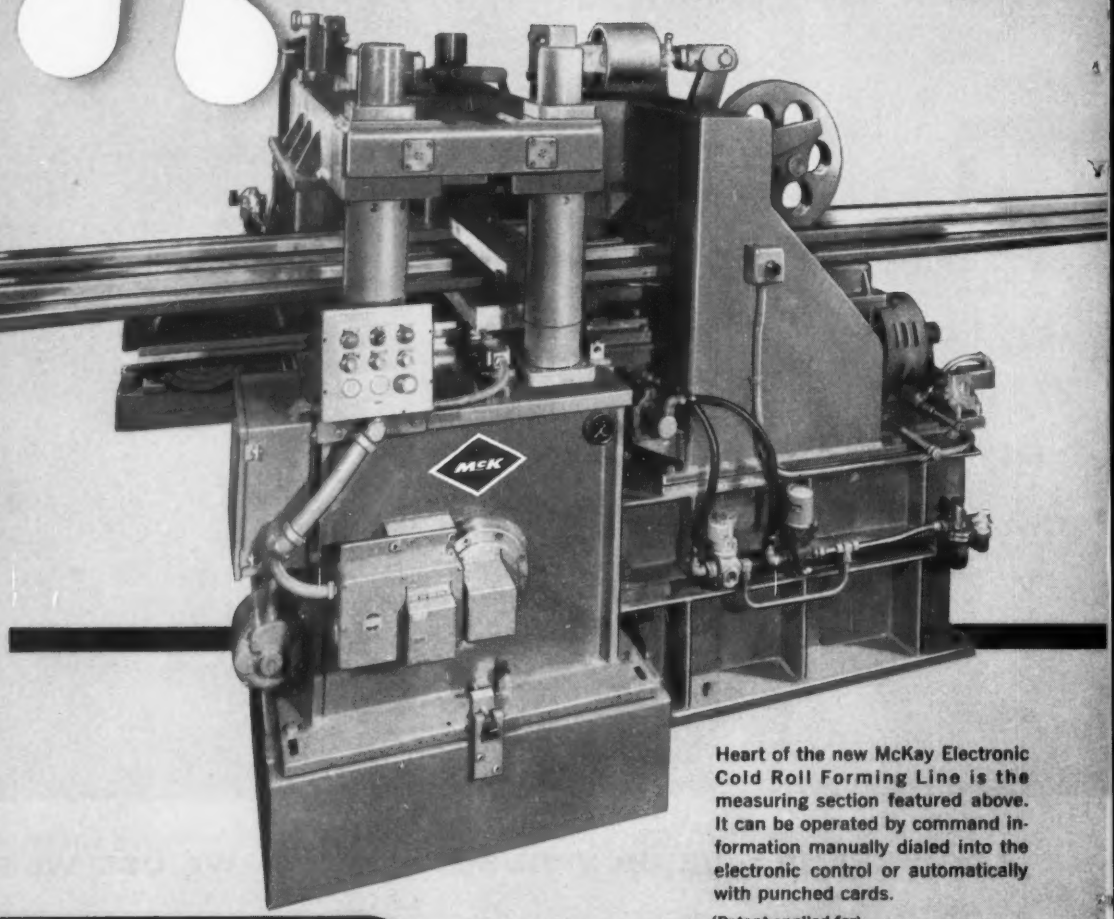
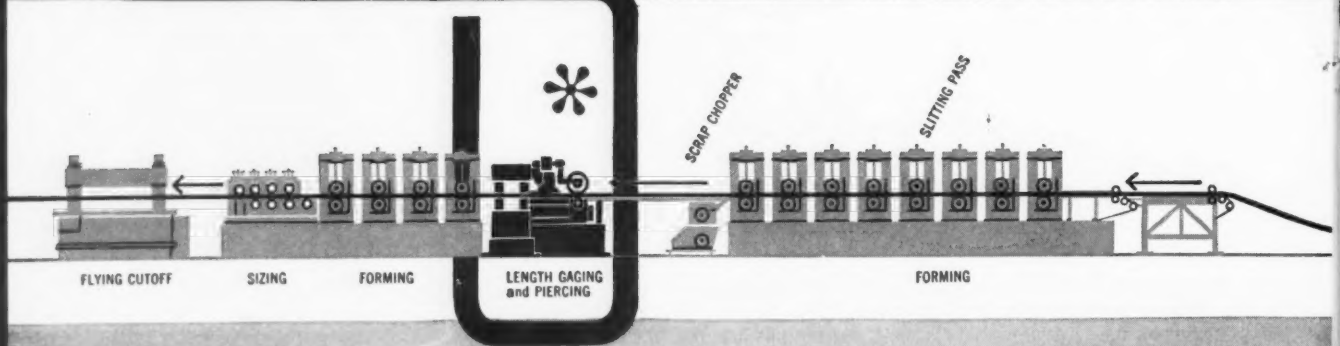


Heart of the new McKay Electronic Cold Roll Forming Line is the measuring section featured above. It can be operated by command information manually dialed into the electronic control or automatically with punched cards.

(Patent applied for)



The line illustrated above was recently purchased by a large building products manufacturer for high speed production of roof and floor deck.

different lengths...

...WITHOUT A MANUAL ADJUSTMENT

McKAY'S ELECTRONIC LENGTH GAGE has a memory permitting instantaneous changes in cut lengths and scheduled quantities as well as precise control of notch and punch spacing on each length.

A transistorized electronic control reads and stores information from punched cards and utilizes an electronic counter to trigger a punching and notching press at precise intervals as commanded by the coded data on the punched cards.

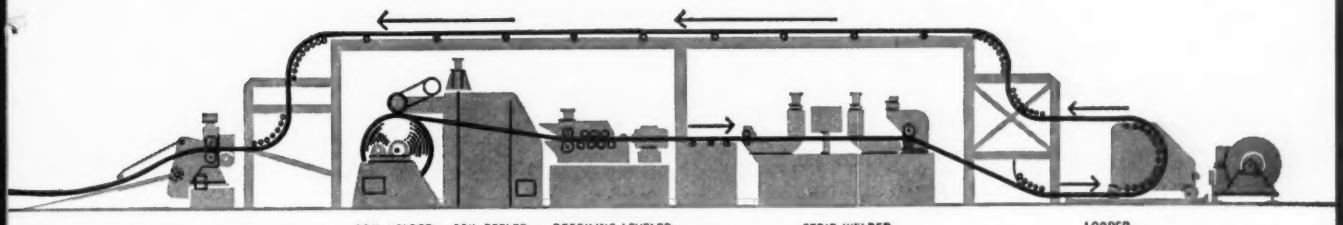
Now! the planning department can schedule the output of a forming or cut-up line without waiting to group identical lengths.

Now! down time previously required for manual length gage adjustment is converted to productive time.

Now! in addition to length control, precise spacing of notches and punches can be controlled and changed by commands received from coded information on the standard data processing card.

BE SURE TO GET THE FULL STORY ON McKAY'S ELECTRONIC GAGE FOR YOUR PRODUCTION LINES.

Call or write the McKay Machine Company, Youngstown 10, Ohio.



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MUNDT
PERFORATED
METAL
MEANS
PERFECT
SCREENS

Specially
Fabricated for
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The superiority of the vast number of products that are—and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel...you *get* it when you buy Roebling.

For information on how our products can help *yours*, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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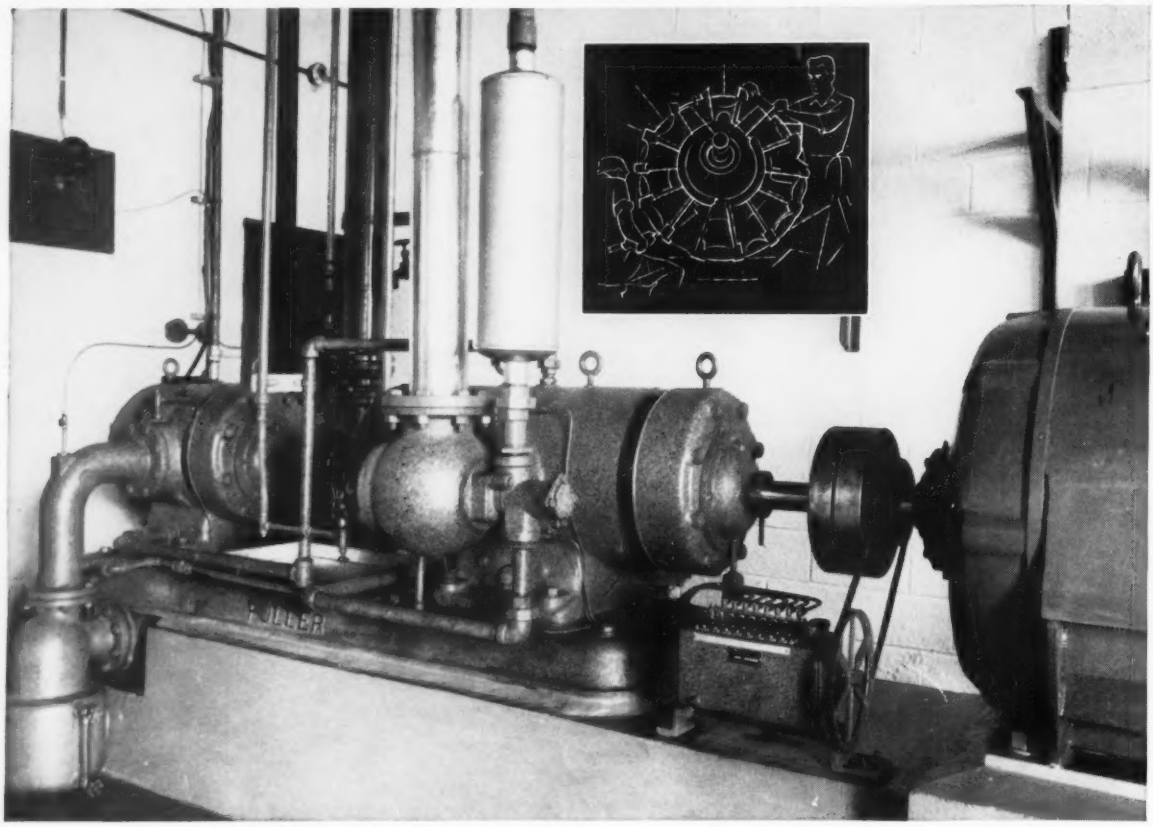

WHY DID AIRWORK SPECIFY A FULLER AIR COMPRESSOR?

Here's what the Vice President-Operations of Airwork Corporation, one of the nation's leading aircraft overhaul companies, writes about Fuller Model C-150-150H Rotary Air Compressors.

"We were running out of air capacity, and had decided that we would like to get rid of the maintenance problems inherent in a piston type air compressor.

"The Fuller compressor with its fewer moving parts and favorable price range met our basic requirements.

"We then checked on Fuller compressor performance through our close contacts with a leading manufacturer of aircraft engines. Their opinion was very favorable. We think Airwork has made the right decision."

Here are the features that sold Airwork on a Fuller Compressor:

- Wide seal between rotor and bottom of cylinder, assuring high volumetric efficiency.
- Rotary design assuring vibration-free flow of air.
- Direct drive.
- Compact space-saving installation.
- Simple foundation.
- No valves to leak or seats to grind.
- Few moving parts, keeping maintenance time to minimum.
- Designed for continuous duty service

When your plant needs reliable air power, call on Fuller. To get all the facts on Fuller Rotary Compressors for capacities up to 3300 C.F.M. and pressure to 125 pounds, write today.

Fuller

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY

C-323
4914

160 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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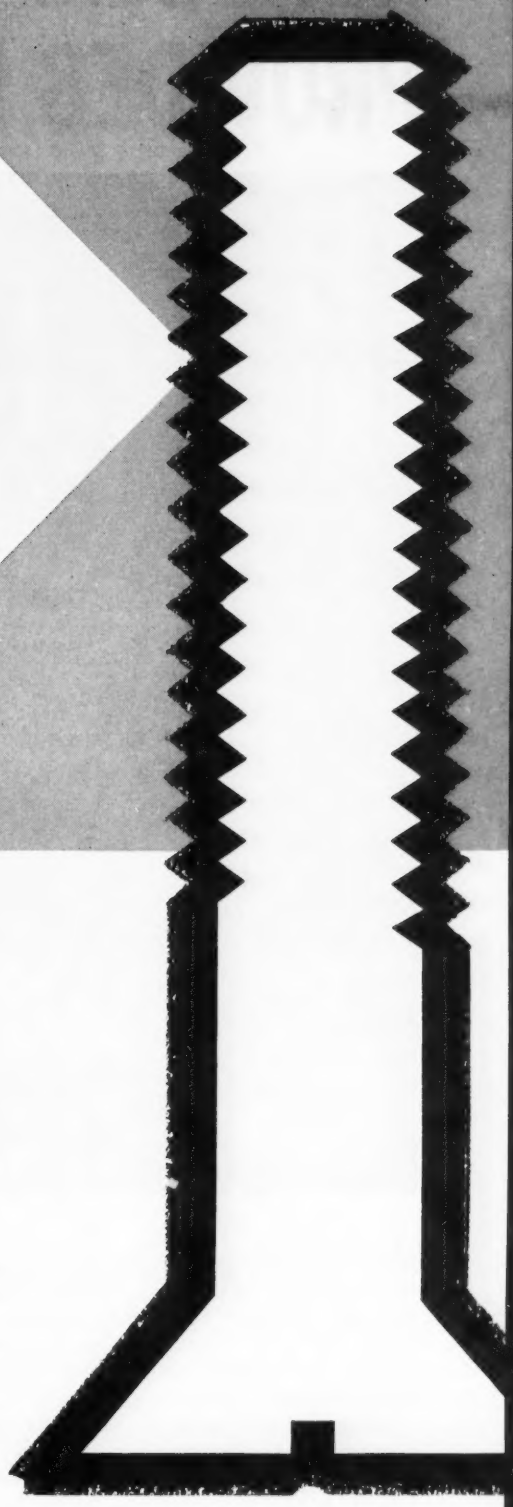
PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

HOW YOUR REPUBLIC BOLT AND NUT DISTRIBUTOR CAN HELP YOU...



Eliminate delays caused by fastener shortages

Short supplies of fasteners, urgently required to meet tight production schedules, need never be a problem when you rely on your local Republic Bolt and Nut Distributor.

From his complete inventories, he can give you quick delivery of fasteners of any type and size—in any quantity, from a single bolt . . . to a case . . . to a truckload.

By so doing, your local distributor eliminates the trouble and expense of maintaining your own on-hand stocks. The net result is a reduction in over-all costs—to you, to your customers, and to the eventual consumer. Your local distributor therefore performs a vital function in today's industrial system.

He is also in a position to provide you with complete information on current fastener trends and techniques. It will pay you to familiarize yourself with the wide range of services he offers you. Contact your local Republic Bolt and Nut Distributor now.

Call your local distributor for quick deliveries of...

REPUBLIC Bolts and Nuts

REPUBLIC STEEL

REPUBLIC STAINLESS STEEL
PROVIDES UNIFORM QUALITY

Here's a good example, illustrating how uniform quality pays off in superior products. The material is Republic ENDURO® Stainless Steel Strip—used to fabricate steel parts around heating elements of electric ranges. This application requires a combination of special characteristics.

Stainless meets these requirements by offering a combination of advantages unobtainable in any other commercial metal. It provides exceptionally high resistance to heat and corrosion; doesn't tarnish, is easy to clean and keep clean; has no applied surface to chip, peel, or wear away.

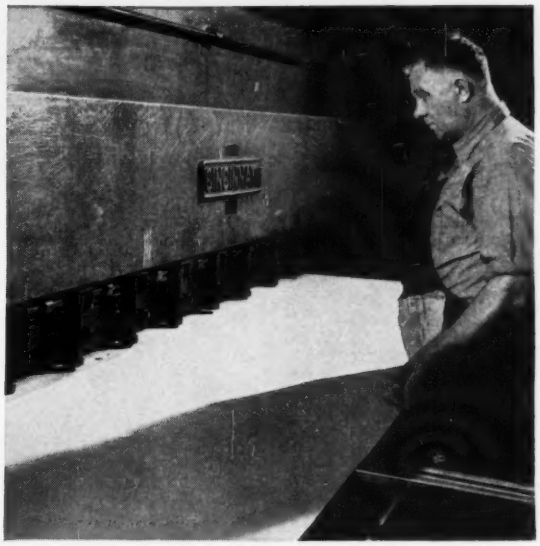
Tuttle and Kift Division, Ferro Corporation, Chicago, Illinois, manufacture a large share of all assembled electric range heating elements produced. In doing so, they find they can depend on Republic Stainless Steel to meet the rigorous standards they demand. Most significant of all, they find the quality is consistent. They also like Republic's excellent metallurgical and delivery services.

Fabrication of heating elements for electric ranges is but one of many applications where the uniformly high quality of Republic Stainless Steel produces excellent results. Use this aristocrat of metals to give your product prestige, eye-appeal, buy-appeal, and built-in sales advantages never before experienced.

It will pay you to get full information on Republic Stainless Steel. Contact your local steel service center, your Republic sales office, or mail the convenient coupon.

FOR SUPERIOR FABRICATION

CONSISTENT PAINT-HOLDING CAPACITY makes Republic Electro Paintlok® ideal for water cooler housings, or for exterior panels of ranges, freezers, dryers, washers, air-conditioners and other major appliances and cabinets for home, commercial and industrial applications. Produced by electro-galvanizing and a chemical treatment process for paint adherence. Electro Paintlok Sheets are shipped from the mill in prime condition for painting.



SUPERIOR FABRICATION FOR OUTDOOR REQUIREMENTS is a characteristic of Republic Galvannealed Sheets. Experience proves its durability, even when only one side is painted. Hot dip galvanizing plus special heat treatment gives Galvannealed its weather-resistant qualities plus a surface exceptionally well suited to take and hold paint. Forming operations fail to damage these outstanding surface characteristics. Flaking or peeling is practically eliminated.

UNIFORMLY TIGHT ZINC COATING on Republic Continuous Galvanized Sheets won't crack, flake, or peel even under the most severe forming operations. Better corrosion resistance is another point that makes Republic your best choice for many fabricating requirements.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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DEPT. ST -7426
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☐ Stainless Steel ☐ Electro Paintlok Sheets
☐ Galvannealed Sheets ☐ Continuous Galvanized Sheets

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Address_____

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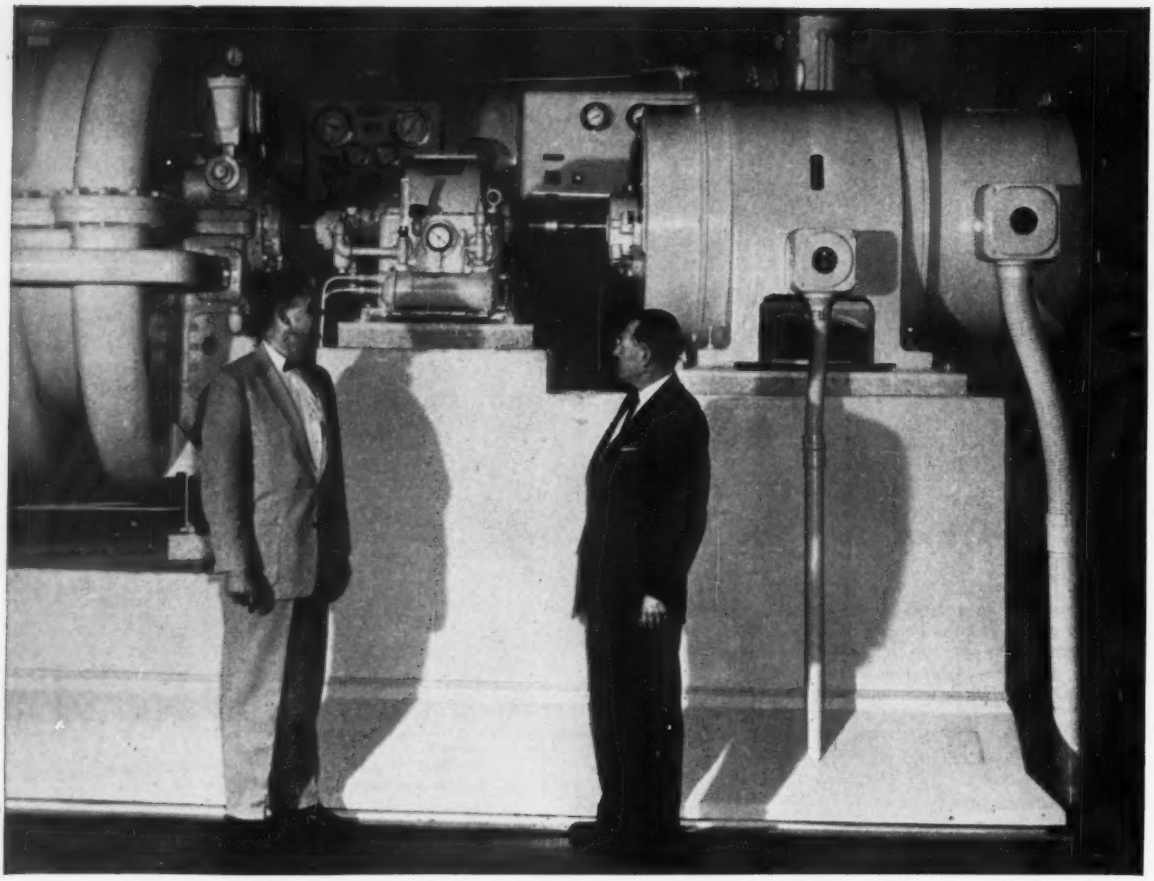


One of two Fairbanks-Morse 4160 volt, 700 hp. slip ring motors which power Carrier refrigeration compressors.

8-speed climate with F-M motors!

Flexible control of new air conditioning system saves power and maintenance for Union Oil Center

Through a new Carrier dual-duct high-velocity system powered by Fairbanks-Morse slip ring motors, the magnificent new Union Oil Center in Los Angeles is ideally air-conditioned at minimum power and maintenance cost.

Providing 8 speeds between 75 and 100 percent of capacity, the two F-M 700 hp. motors make it possible to match operating rpm. of compressors, chillers and condensers to any specific condition. The new Center covers 5 acres, with 1200 employees occupying 426,000 square feet of the office space in a complex of four buildings—an installation requiring the finest in air-conditioning equipment and components.

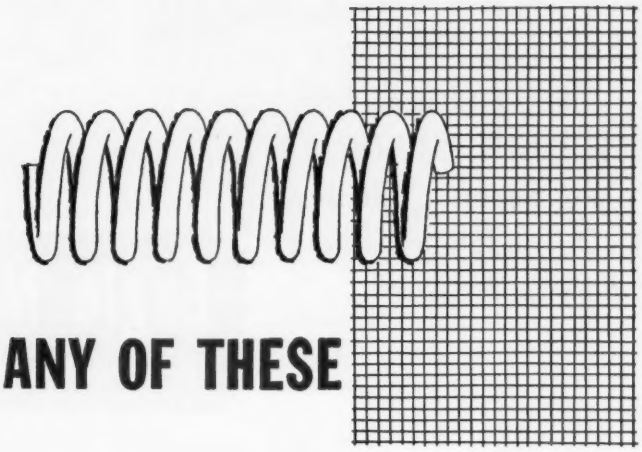
Fairbanks-Morse offers the distinct advantage of a broad range of alternating and direct current motors, in all types, and in ratings from ½ to 10,000 hp.

For expert assistance in specifying, write Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois.

New Union Oil Center in Los Angeles.

FAIRBANKS-MORSE

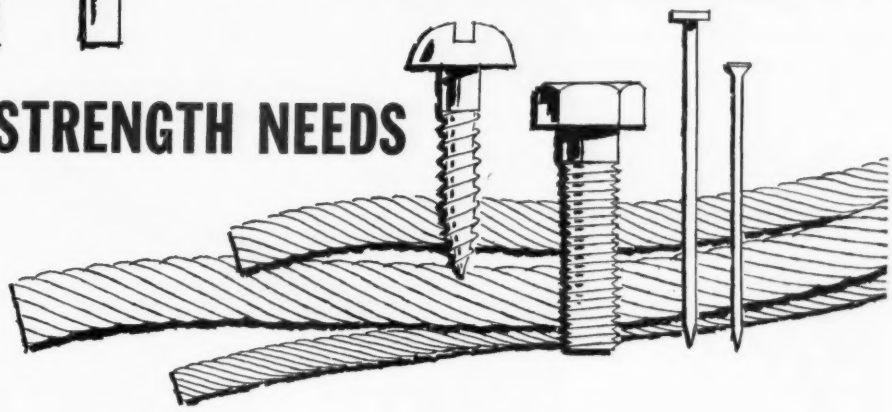
a name worth remembering when you want the BEST



IF YOU MAKE ANY OF THESE

FOR CORROSION RESISTANCE

AND HIGH STRENGTH NEEDS



See what Allegheny Stainless steel wire can do to cut your costs

The assurance of uniform quality, order after order, shows up in lower shop costs in whatever you make from stainless steel wire. A-L specifications are faithful in every batch—in all grades of stainless steel cold-drawn wire, tempered to match many correlations of hardness and tensile strength.

If you make springs, you get uniform tensile strength in every batch of spring wire . . . and also with rope wire.

In weaving wire you get the same dead-soft temper and uniform properties for perfect weaving without ridges.

In cold-headed wire you get absolute uniformity that ties in with automation production processes.

Call on the A-L technical staff for help with selection or fabrication problems, or help in cutting shop costs in processing operations. They will be glad to work with you.

Whatever you make in stainless wire, Allegheny Ludlum offers you adequate stocks of all standard grades for fast shipment. Special stainless steel wire on order.

Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-22.

Write for your copy of Allegheny Stainless Wire, Illustrated 20-page booklet, which fully describes analyses, physical properties, corrosion resistance and principal applications of stainless wire.

WSW 7559

ALLEGHENY LUDLUM

for warehouse delivery of Allegheny Stainless, call RYERSON

Export distribution: AIRCO INTERNATIONAL

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

Made by skilled craftsmen from
WASHBURN STEEL
its Uniformly Superior Quality
insures the Dependability of your
springs. *Famous for years.*

Eagle Music Wire
—for Dependable Springs—

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

WHATEVER YOU WANT A PRESS TO DO...

THERE'S A BLISS PRESS TO DO THE JOB BETTER!

Bliss makes more types and sizes of presses than any other builder

No matter how big or how complex that next metal stamping job may be, it makes sense to call on Bliss. Size never has presented any problem to us, and complexity is our specialty. And because Bliss makes more types and more sizes of presses than any other builder in the business, you're sure to get impartial counsel—sure that your trained Bliss representative will "grind no axe" for any one type of press. And remember this: he's backed by more than a century of experience in building presses of all types, all sizes, for all kinds of industry.

BLISS
SINCE 1857

BLISS is more than a name it's a guarantee

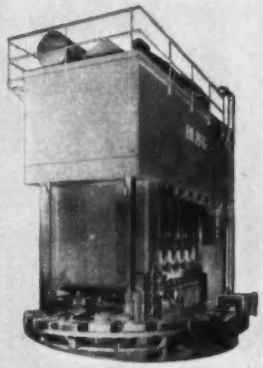
E. W. BLISS COMPANY, Canton, Ohio

PRESSES • ROLLING MILLS • ROLLS • DIE SETS
CONTAINER MACHINERY • CONTRACT MFG.

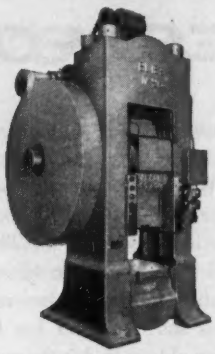
INCLINABLE PRESSES . . . in bench, single or double crank, modern enclosed design. With air friction or mechanical clutches, and whatever you need in cushions and feeds.

STRAIGHT SIDE PRESSES . . . eccentric and crankshaft models . . . any size . . . modern enclosed design, with whatever automatic features you want.

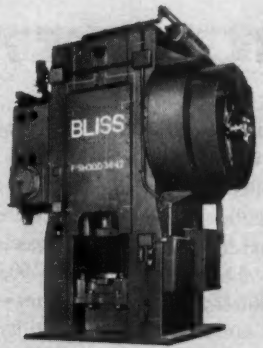
HIGH PRODUCTION PRESSES . . . specially designed for continuous high speed automatic operation. Up to 1000 spm. Available in a variety of sizes . . . and precision feeds.



TRANSFER FEED PRESSES . . . for the ultimate in production. Bliss pioneered the development, now builds them for blank or coil stock work, with no limit on size.

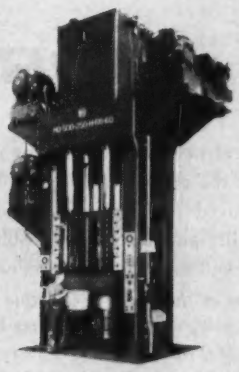


KNUCKLE JOINT PRESSES . . . for slow, powerful application of pressure at near-bottom stroke. Bliss builds them from 75 to 10,000 tons capacity in 40 standard models for coining, embossing, extruding, sizing and swaging.



FORGING PRESSES . . . for production of turbine blades, crankshafts — hot forging, cold coining and other operations. Built in a number of sizes, from 300 to 4000 tons capacity, to standard and special design.

TOGGLE PRESSES . . . Double and triple action designs with quick advance and return speed features; modern electronic controls and automatic lubricating systems. From giant "automotive" sizes to compact units for small parts.



HYDRO-DYNAMIC® PRESSES . . . single action or double open rod construction or closed, 20 tons capacity to 35,000 or even more, standard design or special high speed models, electronic controls —Bliss has built them all.

a.

NEW TITANIUM ALLOYS, IMPROVED PROPERTIES FOR

Several new titanium alloys may prove to be the answer to designers' needs for improved tensile and fatigue strength, ductility and corrosion resistance in aircraft and spacecraft materials.

One of the alloys is Crucible B-120VCA. This new, weldable alloy has the highest strength/weight values of any structural material available. At 220,000 psi, its strength/weight ratio is equivalent to that of steel at 360,000 psi. And it maintains its strength/weight advantage for short times at temperatures up to 1400° F. Furthermore, B-120VCA is "Formageable"® (readily formed in the "soft" solution annealed condition and then strengthened by age-hardening).

As this is written, about 50 aircraft and missile manufacturers are testing Crucible B-120VCA samples. They're reporting: (1) it's easier to fabricate than any other titanium alloy; (2) it seems ideal for rocket motor cases, structural members, rivets and other components.

Several other critical design problems are being solved by Crucible vacuum-melted steels and superalloys. Some Crucible alloy and tool steels, for example, possess tensile strengths in the 280,000/300,000 psi range and even higher. Up to now, getting uniform transverse ductility at this strength level has been a problem. Crucible solved it through vacuum melting.

These developments are typical of Crucible advances in specialty steelmak-

a. Lowering a consumable electrode into a vacuum arc furnace. Metals produced by vacuum melting are "cleaner" and therefore offer improved strength, ductility and longer fatigue life.

b. ***Titanium,*** *more than 1000 lbs. of it, saves 800 lbs. in Convair 880 because of metal's high strength/weight ratio. Principal use is in jet engine pods, aileron, stabilizer, and tail assembly.*

c. ***Crucible Vacuum-Melted Bearing Steel*** *makes stronger, longer-lasting bearings. Rejects during manufacture and early failures are virtually eliminated.*

d. ***Vacuum-Melted 4340*** *was specified for hook pivot pin of bomb rack and rocket launcher when air melted steels failed to withstand 4½ hour destructive vibration tests.*

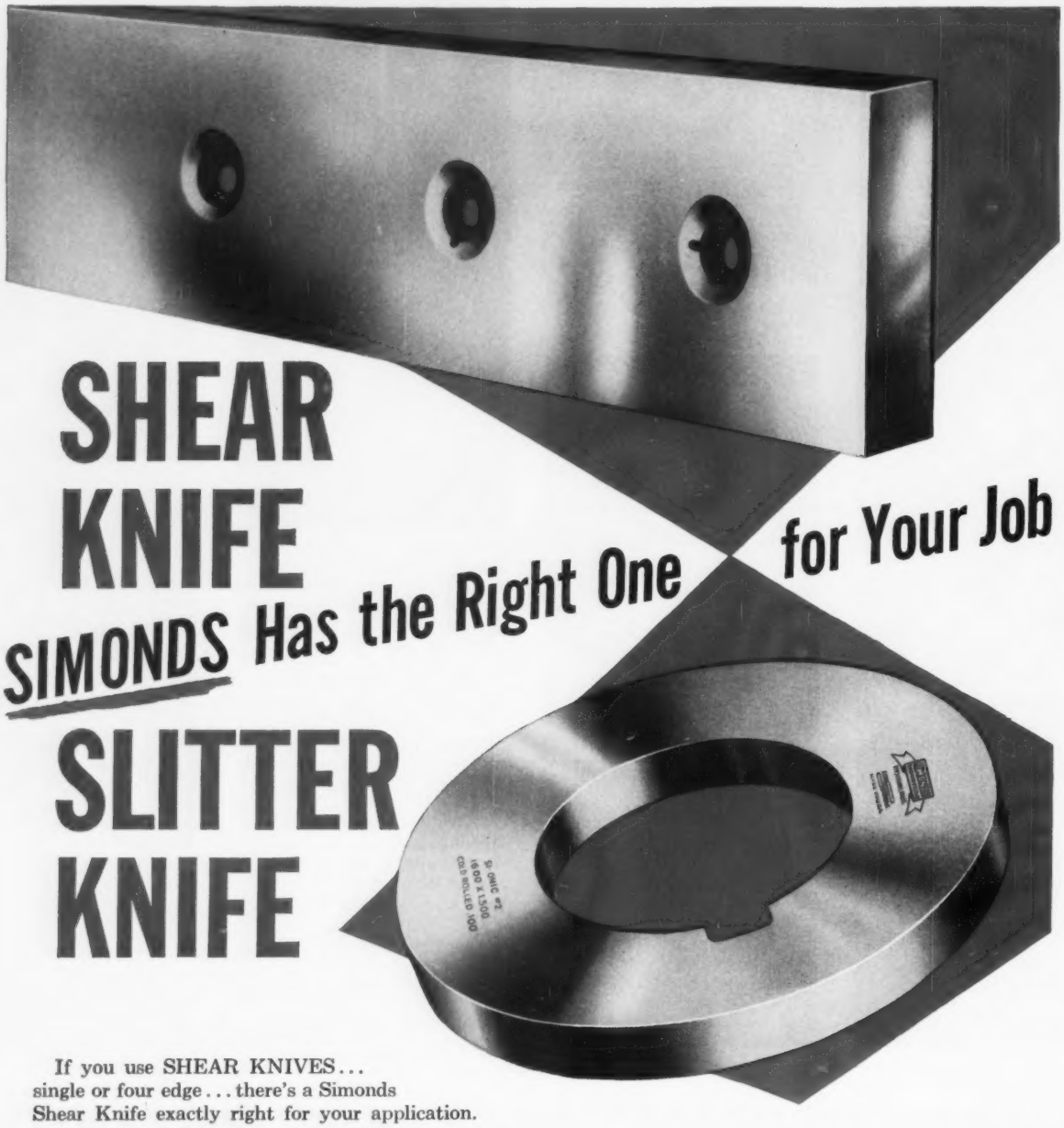
HIGH PURITY METALS PROVIDE MISSILE DESIGNERS

ing. They're possible because Crucible is completely integrated—and because Crucible pioneered in the development of titanium, the high temperature alloys, and in vacuum induction melting and vacuum arc remelting techniques.

Today, Crucible's experience—and newly-increased capacity for vacuum arc remelting of its own special air melted and vacuum induction melted electrodes—provides industry with a complete range of High Purity Metals at lowest cost.

If you'd like to know more about this work, read: "Titanium for Aircraft and Spacecraft" and "Quality Aspects and Engineering Properties of Vacuum Melted Super Alloys and Steels". Write: *Crucible Steel Company of America, Dept. AJ-15, The Oliver Bldg., Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE STEEL COMPANY OF AMERICA



SHEAR KNIFE SIMONDS Has the Right One for Your Job SLITTER KNIFE

If you use SHEAR KNIVES... single or four edge... there's a Simonds Shear Knife exactly right for your application.

And, if you use SLITTER KNIVES, there's a Simonds "Red Streak" Slitter Knife just right for the exact kind of metal you're slitting.

Both of these quality Simonds products are engineered to give you maximum performance. For example, Simonds Shear Knives are heat treated in atmospherically controlled furnaces to insure exactly the right temper and hardness for the desired application. And, each knife is precision ground and drilled to exact machine specifications.

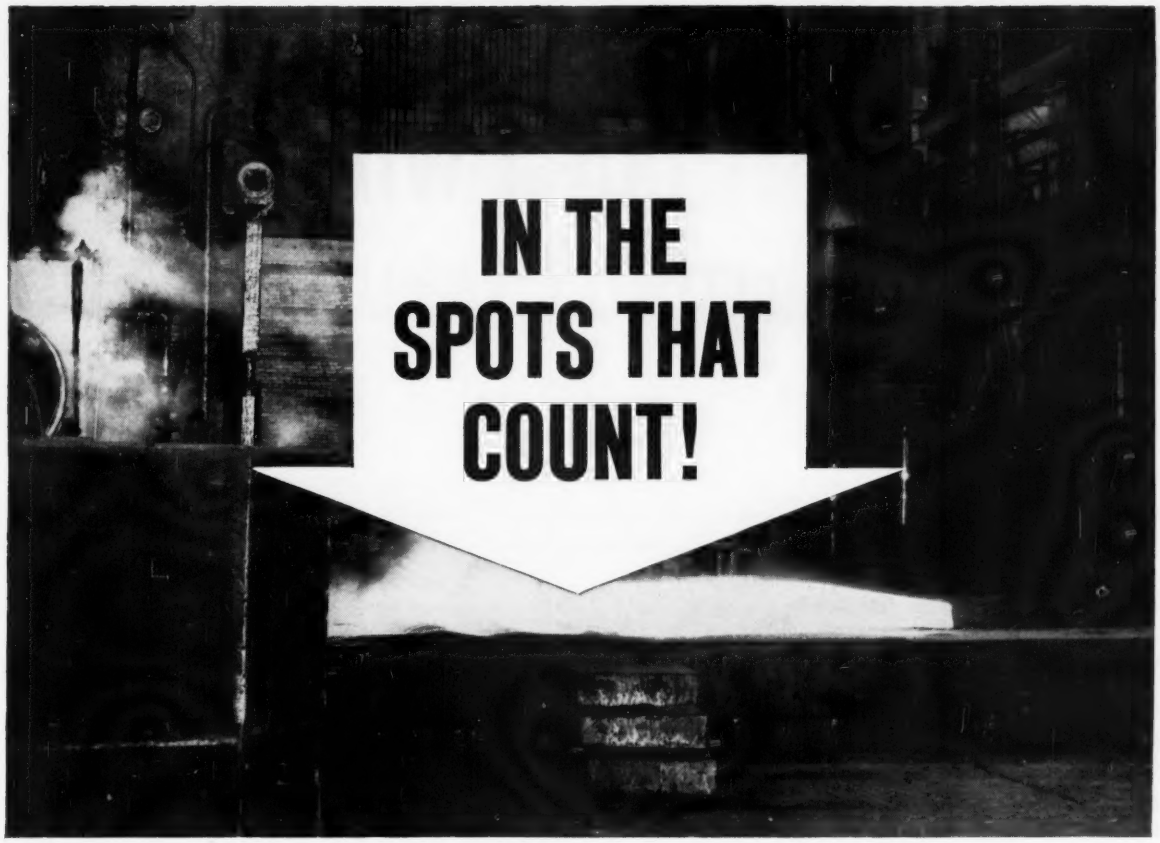
ALL of Simonds Slitter Knives are forged for maximum strength and wear resistance. They are precision ground to close tolerances and feature a low micro-inch surface finish. Hardened and ground Spacing Collars are also furnished as "fitting" companions for the Knives.

Heat treated Separator Discs, made from Simonds Alloy-Steel, resist wear, stay flat, last for years.

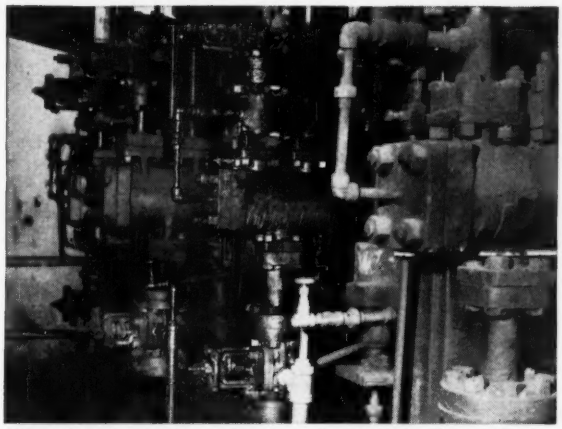
Get full details on these top performers from your nearest Simonds Factory Branch—ask for Bulletins S-20 and S-65.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada



split-second control with Homestead® Operating Valves keeps steel plate rolling!



Solenoid-hydraulic pilot controlled 4" and 2½" Hydro-Cushion Homestead Operating Valves; and Lever-Seald Hydraulic Stop Valves; 800 pounds working pressure.

Six days a week, twenty-four hours a day, 250 times an hour, the tilt tables and middle roll of an East Coast Plate Mill are exactly positioned without shock, and held without creepage, by Homestead Operating Valves. This precision control has permitted record-breaking rolling of the hot steel slabs into plate.

Through more than *three and one-half million* split-second rollings during the two years the 2½" and 4" Hydro-Cushion Homestead Operating Valves have been in service, not one shutdown has been required for valve maintenance! Performance records such as these, are assured by the protected seat and cushioning action of the Homestead Valves.

For any hydraulic control problem, there is a Homestead Operating Valve to meet your needs. Send today for Reference Book 39-6.

Please send Reference Book 39-6 and prices on all types of Homestead Operating Valves. 98

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 98, Coraopolis, Pennsylvania

CF&I WIRE HELPS

"CF&I-Wickwire Wire Spiders give us 25% increase in productivity...20% less downtime... 80% less scrap loss," says Mr. Robert Mangold, Production Superintendent.

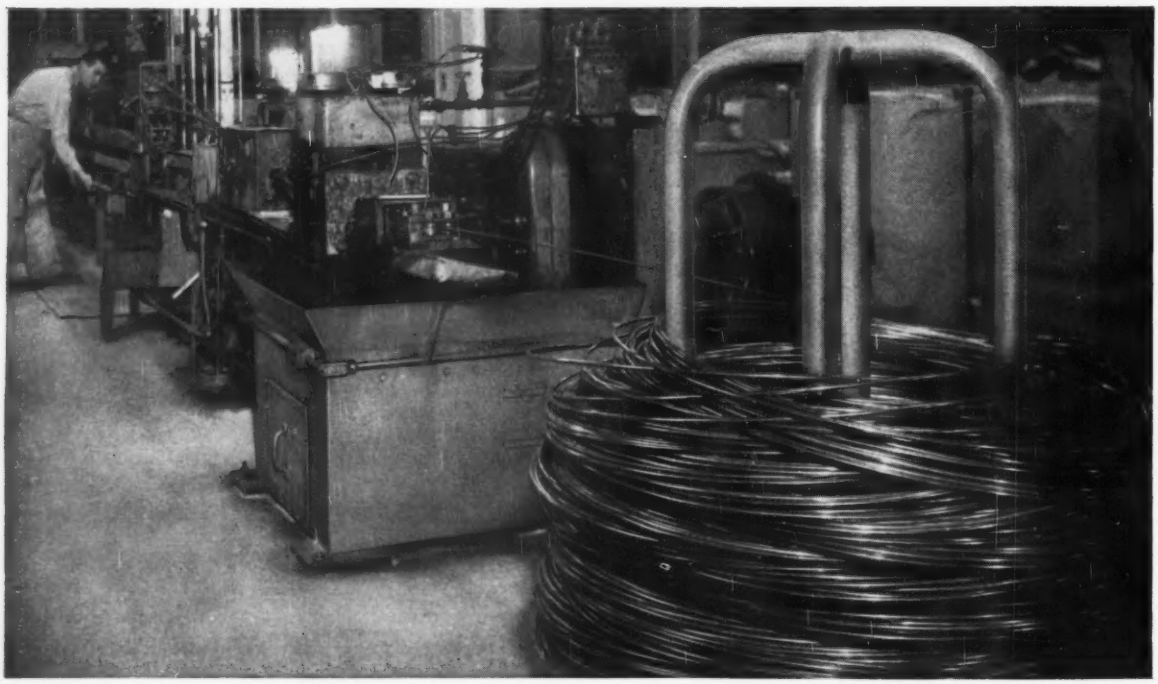
25% Increased Production—"Previously it required fifteen or twenty minutes to reset *each* of the eight to ten small coils used to feed our forming machine," explained Mr. Mangold. "For every eight hour shift, we lost two hours of production. Now with CF&I Spiders—which hold up to a 3000 lb. continuous length of wire—we change coils only once each shift. We save two hours per shift."

80% Less Scrap Loss—"Waste is an important consideration because we lost several feet every time we changed coils. Now we use only one and one-third CF&I Spiders each shift—instead of the eight or ten coils used previously—and have cut our waste 80%."

Increased Safety—"With small coils there was always the danger of the finishing end springing loose while rotating and striking equipment and personnel. With heavy-weight CF&I Spiders which revolve on a turntable while our machine withdraws the wire, the finishing end is securely anchored, reducing the possibility of tangling and eliminating this danger."

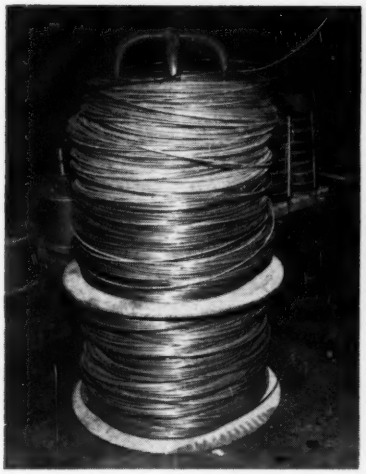
Improved Quality of End Products—"Since we do not have to reset the machine ten times a shift, the quality of our product is more uniform and we have fewer rejects," declared the superintendent of production. For a continuous operation, the end of one Spider can be butt welded to the start of another.

Reduced Handling Costs—"These sturdy Spiders have reduced our handling and storage problems, because each



INCREASE PRODUCTION 25%, CUT MANUFACTURING COSTS

At Bridgeport Brass Co., Flemington, N. J.



Spider contains as much wire as eight small coils. Unloading is safe and quick—one man with a fork lift can do the job easily, freeing several men for other important operations," Mr. Mangold pointed out.

Simplified Inventory Control—No need to sort through piles of wire coils...simply count the number of upright Spiders.

Save Storage Space—Spiders are stored compactly, requiring much less space than cumbersome coils. For maximum economy of space, Spiders can be doubled-decked which is equivalent to stacking 20 mill coils of 300 lbs.

Every CF&I Wire package offers one or more of the following benefits:

- **Reduced downtime through extra long continuous lengths of wire**
- **Simplified inventory control**
- **Fast, economical unloading and in-plant handling**
- **Continued cleanliness of the wire**

A CF&I representative will be glad to discuss your operation with you and recommend the wire package that will help save you time and money.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal

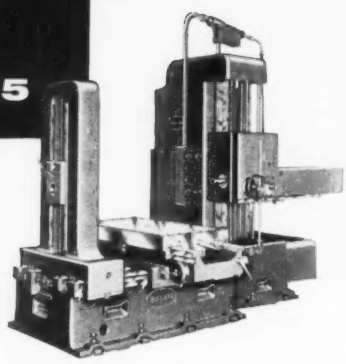
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

6930

GET *MORE FOR YOUR MONEY

. . . with a BULLARD

Horizontal Boring Machine • Model 75



The Gas Turbine Department of the General Electric Company, Schenectady, N.Y., recently installed a Bullard Horizontal Boring Machine, Model 75. We are confident that they got more for their money.

This "*MORE" includes: —

GREATER RIGIDITY — heavier cuts at higher speeds.

PRECISE ACCURACY — hold boring tolerances to .0005.

TABLE OUTBOARD SUPPORTS — provides work alignment even with unbalanced table load.

PENDANT CONTROL — full machine control from position most advantageous to operator.

CHROME HARDENED WAYS — on Bed and Saddle for longer wear.

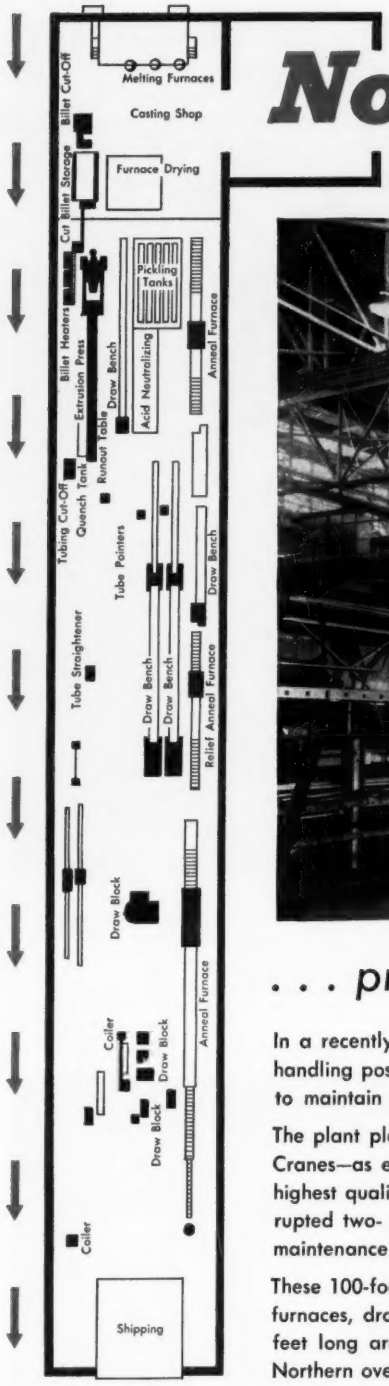
BED LEVELS — built into Bed for easy checking.

FAST SERVICE — after two years of operation, little trouble, and minor complaints handled promptly.

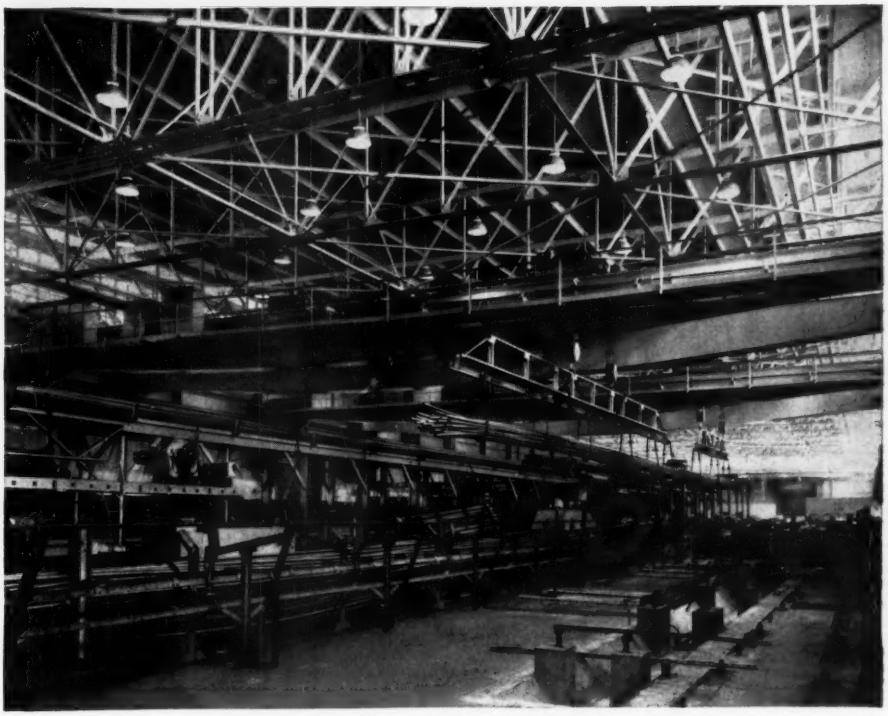
Investigate and compare and you, too — will discover you get more for your money with a Bullard H. B. M., Model 75.

ASK YOUR BULLARD SALES ENGINEER OR WRITE FOR FULL SPECIFICATIONS TO.....

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT



Northern Cranes



. . . preferred in a large tube mill

In a recently built tube mill all production operations are planned around the most effective handling possible of materials and work. The two overhead cranes shown above are essential to maintain production in this plant; it cannot function without them!

The plant planning staff, after comprehensive study and investigation, decided that Northern Cranes—as evidenced in many other strategic, similar installations—provided the substantial, highest quality engineering design and construction necessary for fast, dependable, uninterrupted two- and three-shift operation six days every week with equally essential production maintenance duty over week-ends.

These 100-foot span Northern Cranes were installed to serve all needs ranging from annealing furnaces, draw benches, tube straighteners and coilers to shipping. Loads ranging up to 157 feet long are handled by the two cranes operating together. This is convincing proof that Northern overhead cranes can be fully integrated as an essential part of processing operations.

Our booklet SE-108-F gives details of their many outstanding features. Let us send it to your planning and layout executives.

Invest in Northern Cranes for highest quality service in overhead handling.

MATERIALS HANDLING EQUIPMENT

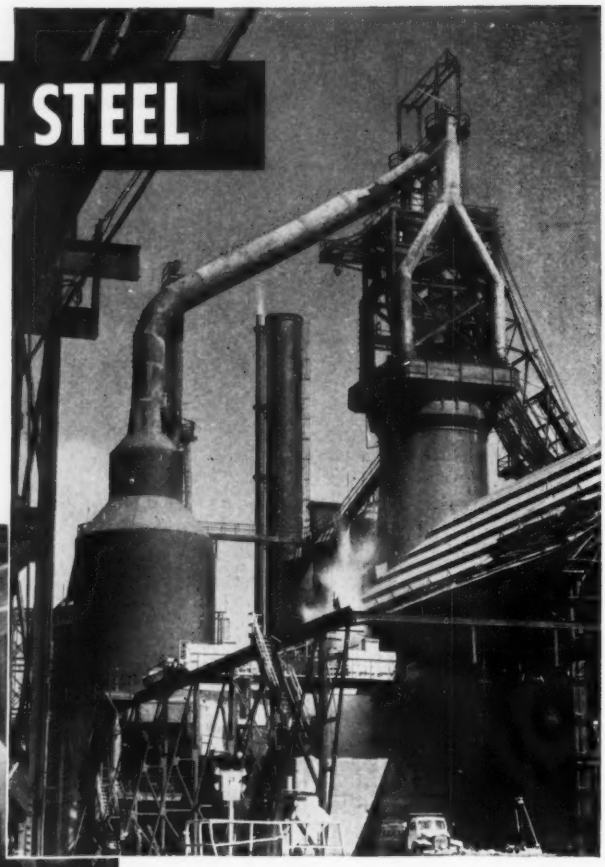
NORTHERN ENGINEERING WORKS

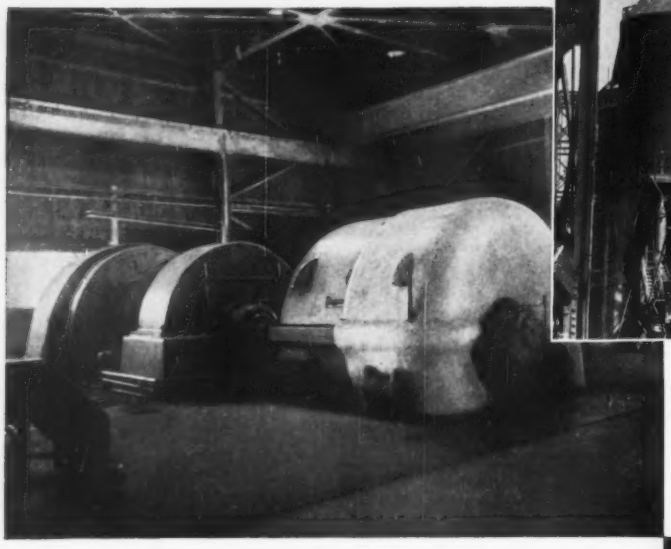
210 Chene Street • Detroit 7, Michigan

SE-2031

AIR for CHILEAN STEEL

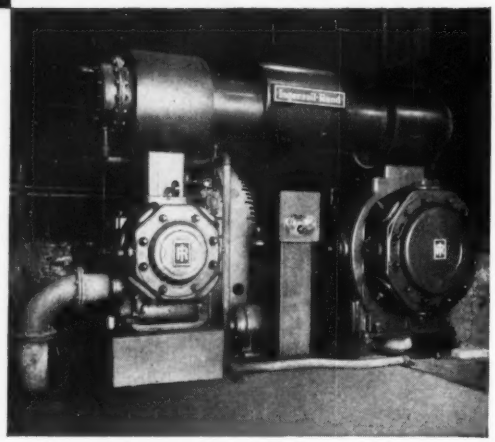
Ingersoll-Rand CENTRIFUGAL AND RECIPROCATING COMPRESSORS provide blast furnace, converter and plant air for Compania de Acero del Pacifico





One of two Ingersoll-Rand 50,000 cfm Blowers supplying air for Compania de Acero del Pacifico's blast furnace, shown above.

One of seven Ingersoll-Rand two-stage, synchronous-motor-driven Class PRE air compressors on air and gas service.



FOR THE past nine years, Compania de Acero del Pacifico has been producing high grade steel for the growing industrial market of Chile. And, like the market itself, the Huachipato Plant, located on San Vincente Bay, has been growing in capacity and diversity of steel production. For example, expansion and modernization of facilities and equipment increased ingot output from 189,000 tons in 1951 to 427,000 tons in 1957.

Air for the blast furnace is provided by two electrically-driven I-R Blowers, each rated 50,000 cfm, 30 psig discharge. Electric motor drive is used instead of conventional turbine drive because of the scarcity and high cost of fuel in Chile and the abundance of hydro-electric power.

The Bessemer converters are supplied by another I-R Blower that delivers 26,500 cfm at 25 psig. And the mill's compressed air and gas needs are provided by seven Ingersoll-Rand Class PRE compressors totalling 3300 horsepower. Other I-R equipment installed here includes a Class ES vacuum pump and two air-cooled T-40 compressors.

Whatever the volume, whatever the pressure, look to Ingersoll-Rand for service-proved dependability in steel mill blowers and compressors.

Ingersoll-Rand

14-918 11 Broadway, New York 4, N. Y.

COMPRESSORS • GAS & DIESEL ENGINES • PUMPS • AIR & ELECTRIC TOOLS • CONDENSERS • VACUUM EQUIPMENT • ROCK DRILLS

KEYSTONE XL *flowability* is the secret of volume production at Thompson-Bremer & Co.

DIVISION OF AMERICAN MACHINE & FOUNDRY CO.

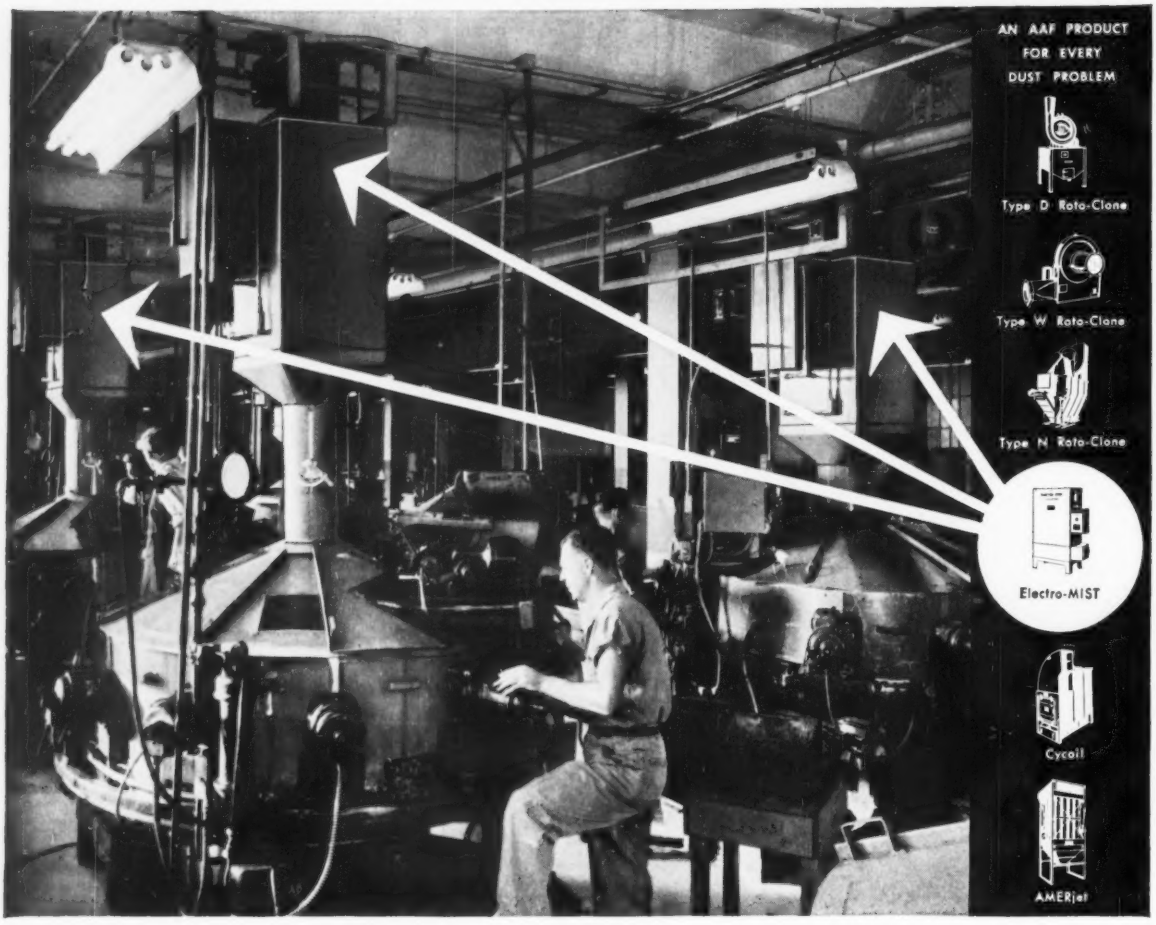
Users of Sems fasteners recognize this familiar symbol as the Everlock trademark of Thompson-Bremer & Co. division of American Machine & Foundry Co., Chicago, Illinois. Using Keystone XL Wire, head cracking is eliminated and die life increased 30%. They manufacture many fasteners in two blows including this 5 diameter Sems, or this Phillips hex screw with a 4½ diameter head and extruded pilot point. Keystone and Thompson-Bremer worked together to develop just the right wire to produce a better quality product at a competitive cost. Confidential counseling and metallurgical assistance is yours for the asking, too! Call us.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

WET MACHINING



AAF *Electro*·MIST precipitators keep oil mists in their place

● Cleanliness of workmen, work area, and machines prove that the wet machining of tire valve stems need not be a greasy, oil-spattering, fire-hazardous process. Provided, of course, that AAF Electro·MIST electrostatic precipitators are on the job—trapping and collecting oil mists right at their source.

AAF's complete line of dust control equipment was application-developed, now challenges *any* metalworking dust problem, regardless of the metal. Where are troublesome dust, fumes or mists causing you trouble—grinding, buffing, polishing, plating, dry machining, wet machining, heat treating, abrasive cleaning? All can be effectively and economically controlled by AAF.

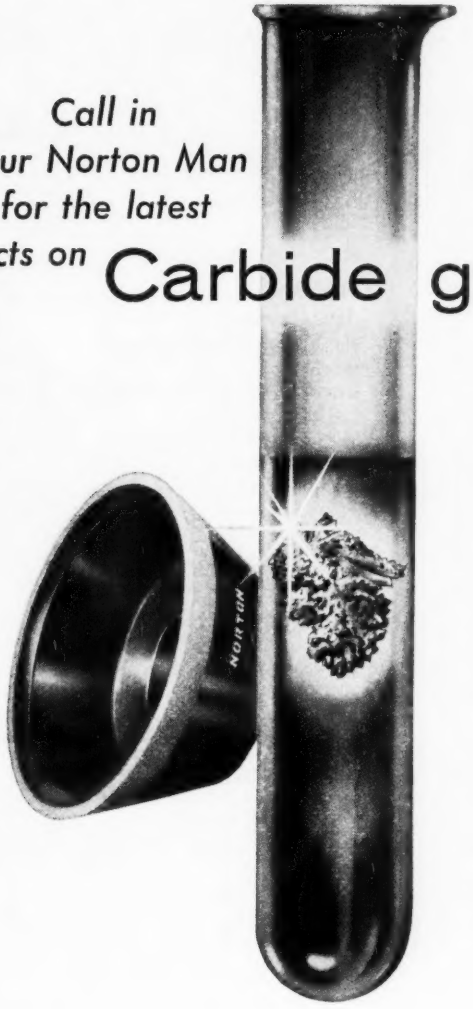
For the answer to your machining problem, call your local AAF representative, or write direct for Electro·MIST Bulletin 251. Address Mr. Robert Moore, American Air Filter Company, Inc., 443 Central Avenue, Louisville, Ky.

AAF **American Air Filter**
BETTER AIR IS OUR BUSINESS

Call in your Norton Man for the latest facts on

Carbide grinding with Norton wheels

using mined or man-made diamonds



Magnified View of a man-made diamond. The extremely jagged surface provides a large, tight-holding contact area for bonding. In the new Norton SD* wheels this extra gripping power, teamed with advancements in diamond wheel construction, reduces diamond loss and carbide loading to a minimum — typical of Norton leadership in getting the maximum working power out of all diamonds, mined or man-made.

Norton diamond wheels — the most complete line for carbide grinding — are backed by pioneering never equalled, whether the diamonds used are mined or man-made.

Norton began its leadership in diamond wheel development back in 1930 . . . introduced all three bond types . . . does all its own sizing and checking of diamonds . . . duplicates wheel specifications with constant accuracy.

Norton leadership continues with the use of man-made diamonds. These newest diamonds last longer for many carbide grinding operations because they are more firmly anchored in the bond . . . and because their greater friability presents new cutting edges faster, decreasing power requirements and speeding cutting action.

Man-made diamonds are used to fullest advantage in the new Norton SD* wheels — proved in more than a year of nationwide, comparative testing . . . *In 63% of hundreds of field tests the average service life of Norton SD diamond wheels was at least 25% longer than the life of wheels using natural, mined diamonds.*

With each Norton diamond wheel, of mined or man-made diamonds, you get a certificate of the accuracy of diamond concentration. You can depend on this certificate to mean exactly what it says.

You can depend on your Norton Man, too. This expert Abrasive Engineer can show you how to get better grinding quality, longer service life and lower cost grinding for every dollar you spend on diamond wheels. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Man-made diamonds W-1944

NORTON ABRASIVES

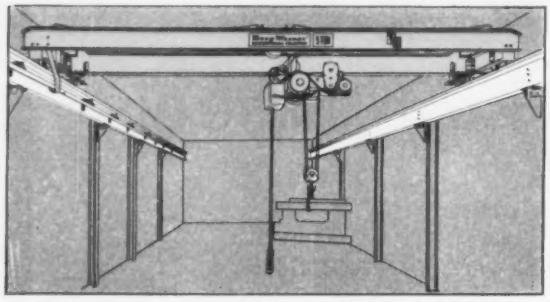
Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Borg-Warner INDUSTRIAL CRANES

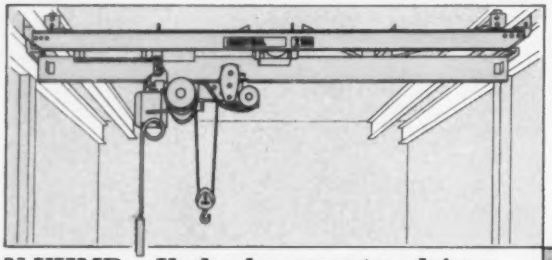
Interchangeable, standardized components give you top value in every type, every capacity...

The widest use of standardized sub-assemblies and components gives you **more** crane, **more** performance and **greater** dependability for a **smaller investment** when you choose a crane by Borg-Warner Industrial Cranes. You may be most pleasantly surprised when you learn how little a quality crane costs from Borg-Warner Industrial Cranes. Ask for an estimate without delay.



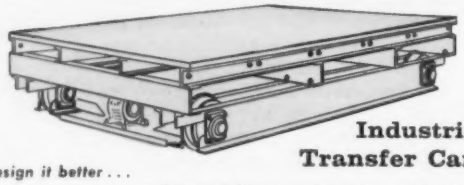
N-TRMD Top running, single girder motor driven crane with outrigger.

An excellent value and a top performer. Uses monorail hoist. Capacities up to 10 tons.



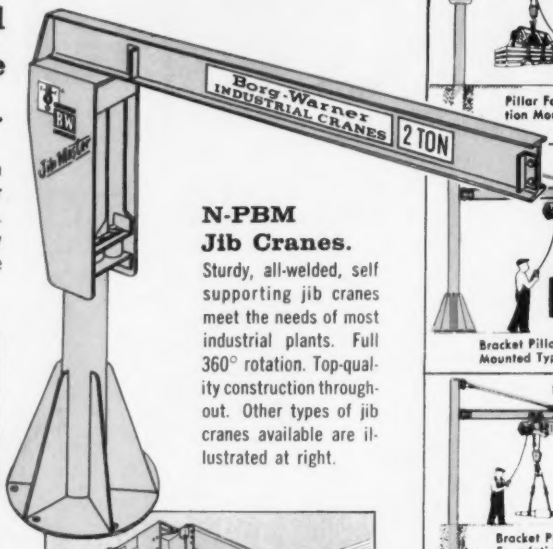
N-UHMD Under hung motor driven single girder crane with outrigger.

Available in capacities to 10 tons and spans to 50 feet. These smooth operating, rugged cranes are ideal where building structure will support the weight.



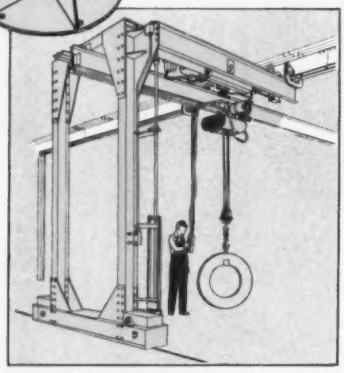
Industrial Transfer Cars

Designed for rugged service, with air or electric power. Available in a wide choice of capacities and designs.



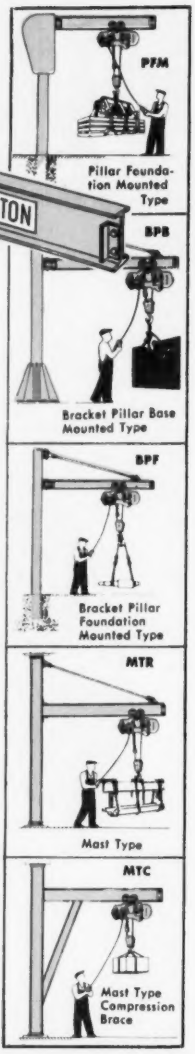
N-PBM Jib Cranes.

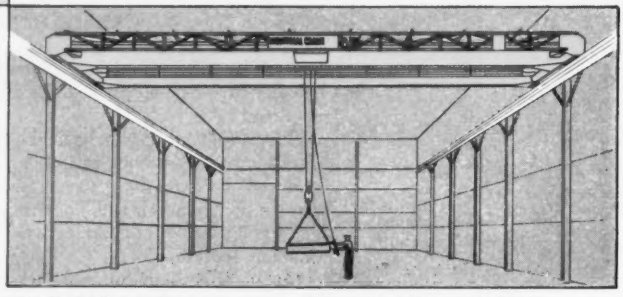
Sturdy, all-welded, self supporting jib cranes meet the needs of most industrial plants. Full 360° rotation. Top-quality construction throughout. Other types of jib cranes available are illustrated at right.



Semi-Gantry

Special designs available utilizing standard components. Single girder capacity to 10 tons. Double girder to 20 tons.





N-TRMD-DG Top running, double girder motor driven crane with outrigger.

Capacities to 20 tons. Available in spans to 60 feet. Where service requirements are not heavy duty, these economical cranes built of standard wide flange beams are outstanding for service and reliability. Cab or floor controlled.

Design it better . . .

Make it better.

Industrial CRANES — INGERSOLL PRODUCTS — B-W — BORG-WARNER

Borg-Warner Industrial Cranes also designs crane equipment for HEAVY INDUSTRY, constructed to specific requirements and to Association of Iron and Steel Engineers specifications for steel mill cranes.

Borg-Warner® INDUSTRIAL CRANES

1550 S. PAULINA STREET, CHICAGO 8, ILLINOIS

Export Sales: Borg-Warner International, 36 South Wabash Ave., Chicago 3, Illinois

Photos courtesy of The Universal Steel Company

To cut inventory costs, make your Youngstown Warehouser your local "steel service center". Make full use of his complete local stocks, fast delivery service. His one-source service simplifies your purchasing and bookkeeping, too. You'll find him an efficient, time-saving, partner-in-production.

AMERICAN STEEL WAREHOUSE ASS'N

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Youngstown, Ohio

Manufacturers of Carbon, Alloy and Yoloy Steel

Automotive Power Steering Manufacturer Specifies

Cold drawing Ostuco tubing through precision ring die on cold draw bench at Shelby mill. Mandrel controls and sizes I.D.

"Automotive components are our business. We have produced literally millions. And we're still learning every day.

"One of the lessons we learned early in the game is that you can't beat Ostuco tubing for surface finish. It cuts our machining costs, keeps us on top competitively.

"There are other reasons, too, why Ostuco tubing tops our preferred list. We like its consistently close tolerances and unvarying quality, shipment after shipment. You might say we like its *product integrity* . . ."

To learn more about what Ostuco tubing can do for *your* production, contact your Ohio Seamless representative, listed in the Yellow Pages, or the mill at *Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.*

AA-9431

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OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company • SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

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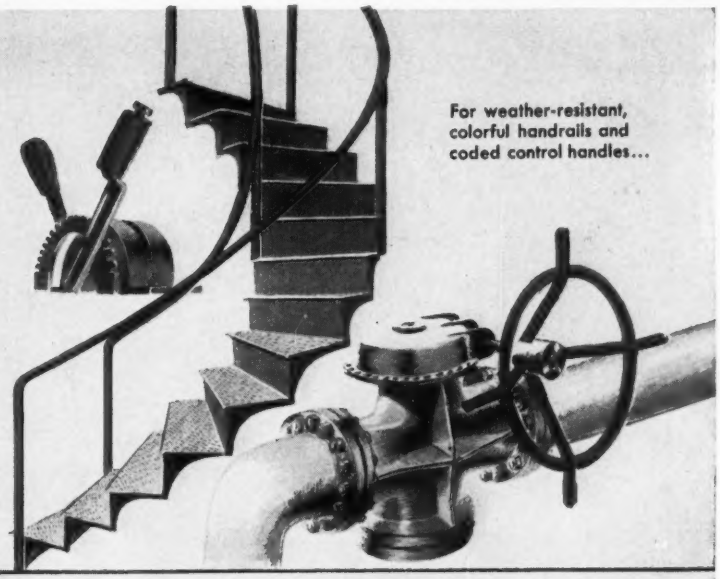
NEW WAY TO UPGRADE YOUR PRODUCTS: VINYL COATINGS

Vinyl coatings on tool handles are tough, wear-resistant, easy-on-the-hands, electrically safe. Can be applied in thicknesses up to 1/16" (60 mils) in one dip.



For weather-resistant, colorful handrails and coded control handles...

For making nonslip ladders, "silent" cutlery drawers...

For bumpers, seats, wheels on metal toys...

Leather-like coatings for metal

You'll see a host of profitable ways to use vinyl coatings when you try their pleasant "feel" and test their tremendous durability. Vinyl coatings feel like leather, wear like flooring. They insulate, control corrosion. Are virtually immune to ordinary chemical attack.

You can apply these resilient coatings to your products in a range of thicknesses simply by dipping them in a vinyl dispersion. A short heat-cure at moderate temperatures "sets" the elastomer and permanently bonds it to the metal.

Vinyl coatings can eliminate some steps in finishing operation, actually reduce total costs. Coatings can range from soft and rubbery to "tire-casing" hard—in any color you choose.

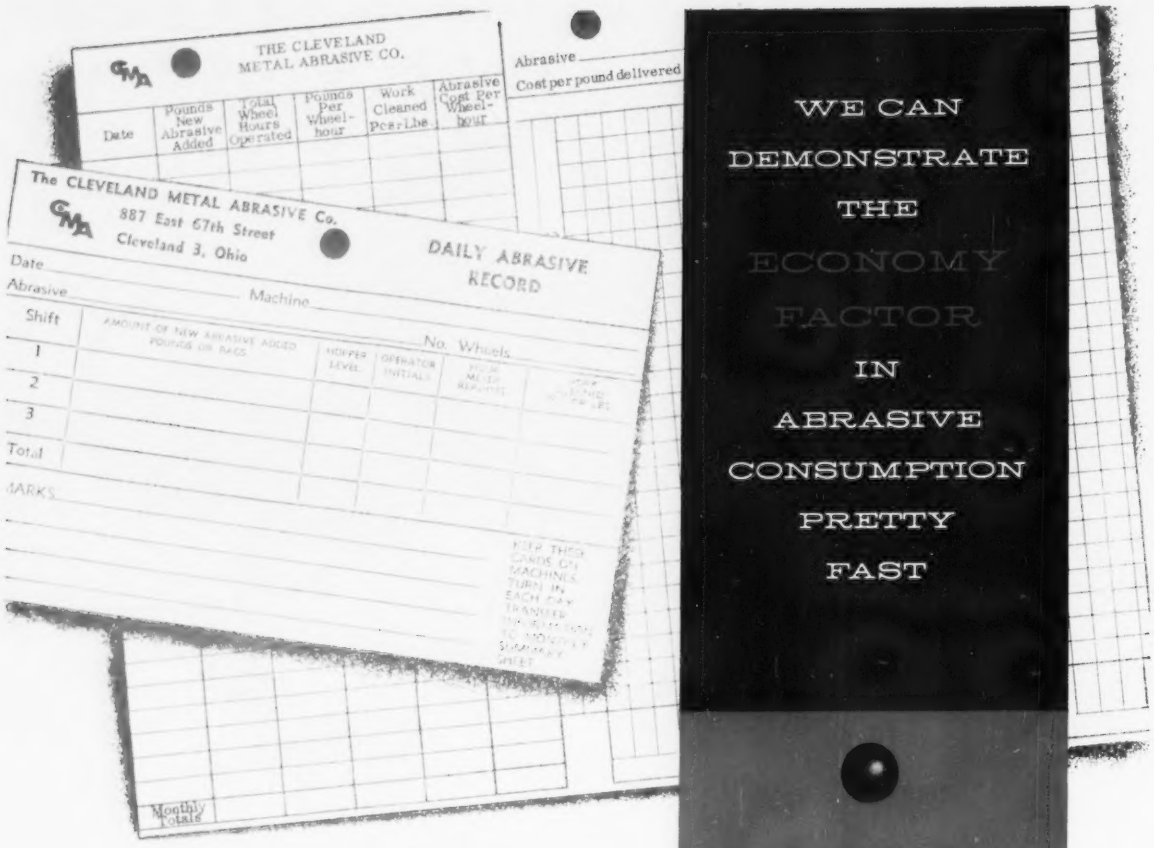
Write for sources of vinyl in liquid form for coating glass, metal, or wood. Get a head start on investigating the many new, market-building ways you can use vinyl dispersions. Write today!

Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Dept. SP-4, St. Louis 66, Missouri

Monsanto manufactures a wide variety of plasticizers and Opalon® resins for formulators of these high-quality vinyl dispersions.

Monsanto®

Where Creative Chemistry Works Wonders for You



Simple arithmetic and common sense establish the pattern. It's simply a matter of making high quality, *long-lasting* abrasives. The less you use, the more money you save. Take Cleveland High-strength "A" iron shot and grit. Greater abrasive life and decreased machine maintenance costs offset any minor increase in initial costs. Bargain prices cut no ice . . . ever.

Prove to yourself the savings you get from this, and other, Cleveland Metal Abrasives. Write—and ask for our new abrasive cost system, which our engineers can quickly establish for each machine, at no cost to you.

Also write us today for more information, together with new catalog No. 159, or call our nearest representative.

CLEVELAND is the name and the place for PERSUASIVE ABRASIVES

1. Realsteel Shot and Grit	2. Pearlitic Malleable	3. Normalized
4. "A" Iron	5. Hi-Strength "B"	6. Chilled Iron
		7. Cut Wire

the CLEVELAND metal abrasive company

GENERAL OFFICE: 888 East 67th Street • Cleveland 3, Ohio • PLANTS AT Howell, Michigan; Toledo; Cleveland

World's Largest Production Capacity

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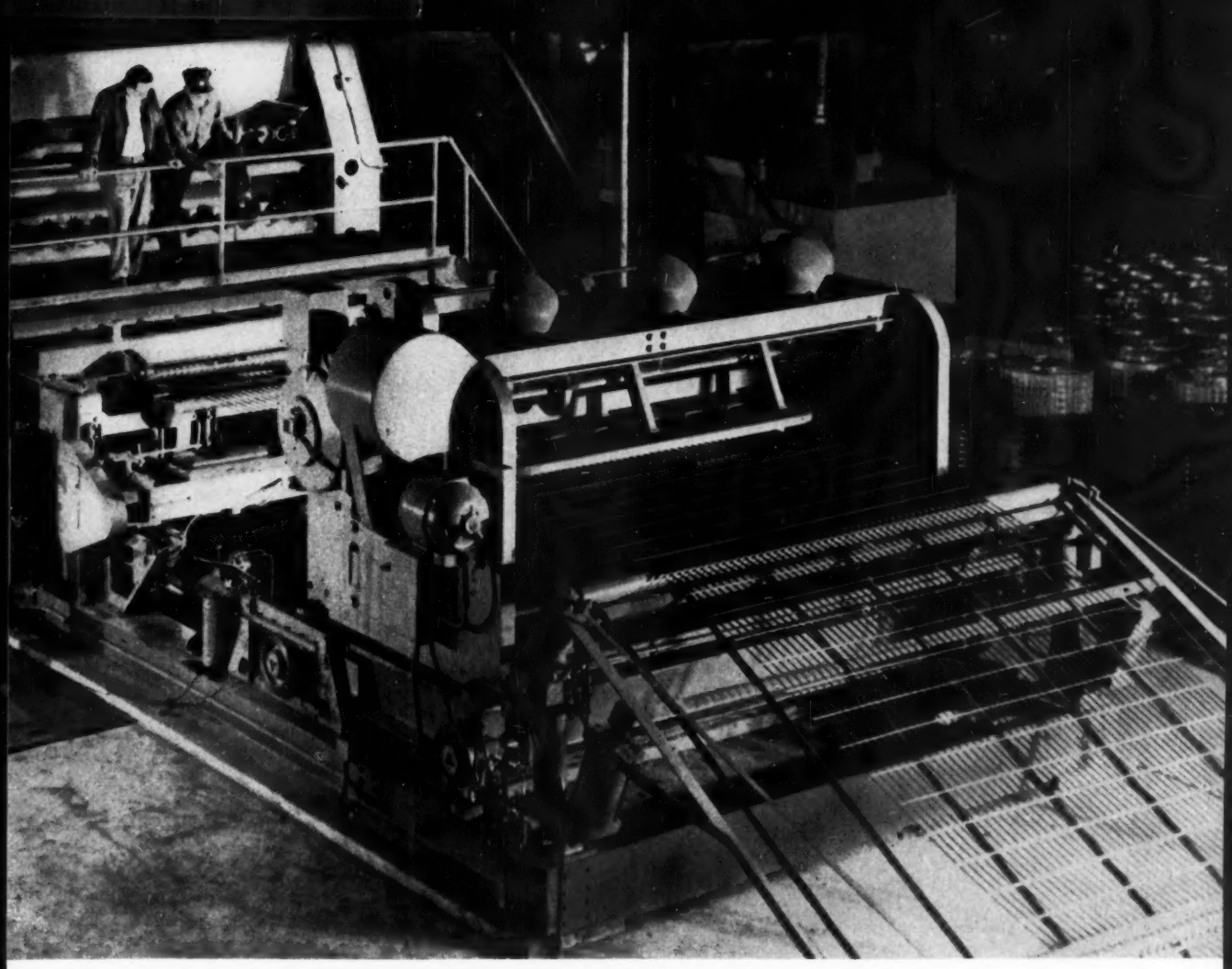


Cincinnati® Shear cuts wire mesh at Pittsburgh Steel

The Cincinnati Shear shown is part of an automatic wire welding machine at Pittsburgh Steel Company, Monessen, Pennsylvania. The machine produces wire mesh and fabric used for concrete pipe, buildings, and other applications. The photograph shows the shear cutting forty-seven 2/0 gauge (.331″) wires per stroke. The wire is low carbon, cold drawn steel. Other jobs require shearing mesh with wires up to ½″ diameter. This shear was specially engineered for this type of application. Because cuts are heavy and production is continuous, Cincinnati dependability is essential.

Standard Cincinnati Shears® offer such productive features as powerful hydraulic hold downs, all-steel interlocked construction, and one-clearance shearing of different metal thicknesses.

Write Department C for Shear Catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio

TEXACO ORGANIZED LUBRICATION CAN HELP YOU . . .

End replacement parts waste

One Northeastern manufacturer replaced parts in a major machine every two weeks —a not uncommon practice in industry today. He marked it off as a normal maintenance expense. It wasn't really—it was the result of faulty lubrication practices. A Texaco Lubrication survey spotted the trouble—solved the problem. Now the manufacturer operates with a Texaco Organized Lubrication Plan—and the trouble no longer exists.

Chances are the same thing is happening in your plant right now—It doesn't have to. A Texaco Organized Lubrication Plan can extend parts life significantly—saving thousands of dollars in replacement parts and even more in uninterrupted production for longer periods.

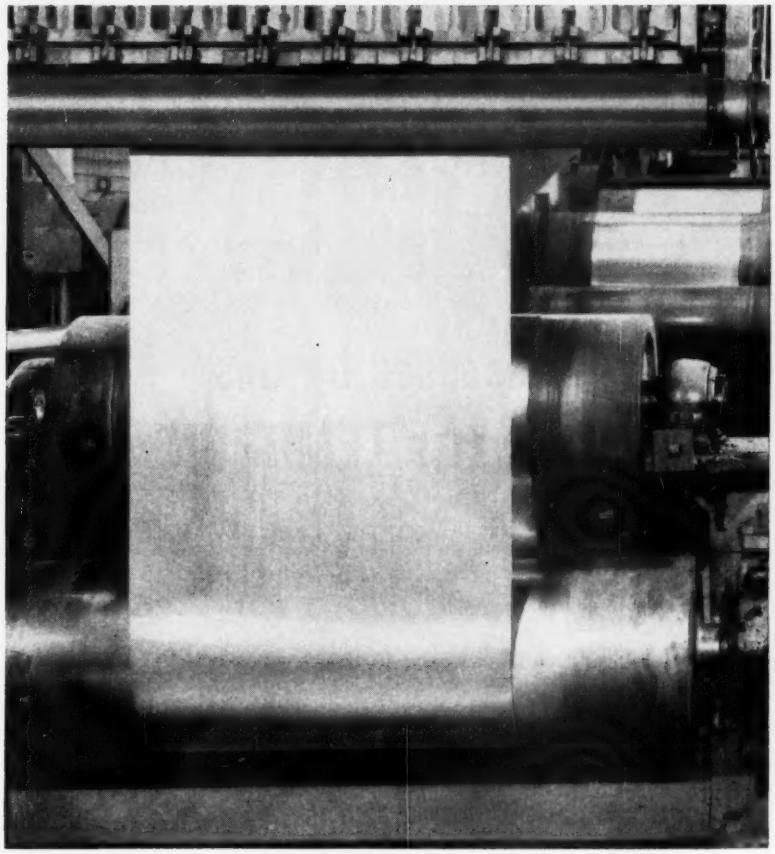
Get full details on Texaco Organized Lubrication from your local Texaco Lubrication Engineer. He can supply you with a copy of "Management Practices that Control Costs via Organized Lubrication." Or write:

Texaco Inc., 135 East 42nd Street, New York 17, N.Y., Dept. S-112.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

AT KAISER STEEL CORPORATION, FONTANA, CALIFORNIA

USS Continuous Strip Tracking System speeds annealing process



Here, the strip enters the furnace section of the line, under positive alignment and control as provided by the USS Continuous Strip Tracking System.

Continuous annealing line, Kaiser Steel Corp., Fontana, Cal.

A USS Continuous Strip Tracking System like the one recently installed at Kaiser Steel's Fontana plant speeds up tin plate production because it *prevents* mis-alignment, rather than trying to correct it after it happens.

The System provides *constant* control of strip alignment throughout the line, without strip distortion, at speeds up to 1250 feet per minute. The specially designed roll complement, including LORIG-ALIGNER Self-Centering ROLLS, maintains strip material on the pass-line without the use of exterior controls.

Processing lines using the Continuous Strip Tracking System turn out strip that is more uniform from coil to coil. This system can process fragile light-gauge strip at elevated temperatures and at speeds not possible with any other type of guiding methods.

United States Steel's Strip Tracking System works equally well in either ferrous or nonferrous metal processing lines. For more information, send in the coupon.

USS and LORIG-ALIGNER are registered trademarks

United States Steel
Room 6035, 525 William Penn Place
Pittsburgh 30, Pa.

Please send me your booklet, "LORIG-ALIGNER Self-Centering ROLLS."

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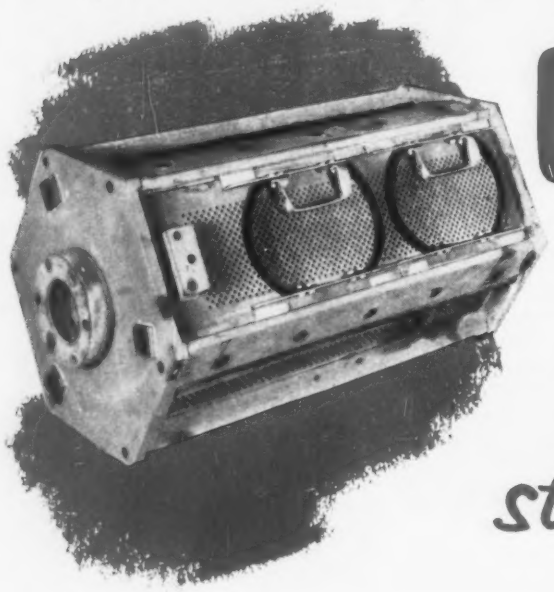
United States Steel

3,500,000 pounds of plating



processed by this UDYLITE TEMPRON cylinder . . . and it's *still going strong*

Al Betteley of Bellevue Plating says:

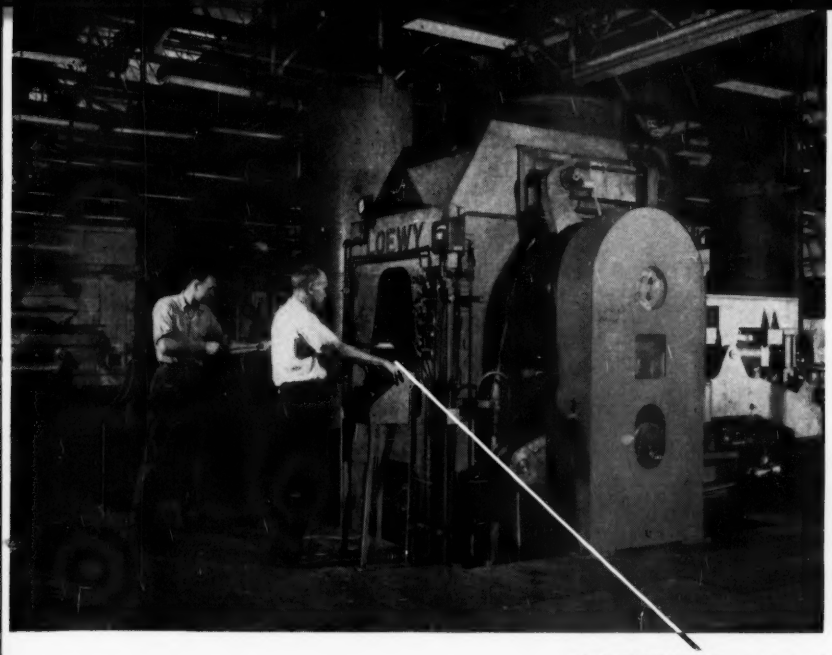
"We are thoroughly satisfied with Udylite TEMPRON Cylinders. The only reason that we haven't bought more of them for our present equipment is that we haven't worn out the original ones. You may be sure that we will specify Udylite TEMPRON cylinders on any new equipment of this type."

This TEMPRON Cylinder has handled more than three and one half million pounds of work without replacement or repair. This impressive performance was recorded at the Detroit plant of Bellevue Plating, a division of National Machine Products Co. There, 24 of these cylinders continue daily to deliver high economy, low maintenance production for the fifth straight year. They are operated regularly under extreme and abrupt temperature changes stubbornly resisting heat, cold, abrasion and chemical action.

In the experience of users everywhere, these rugged TEMPRON Cylinders, an original Udylite design, prove to be a best-possible buy. You, too, can achieve full production with an absolute minimum of shut-downs for maintenance by installing durable Udylite TEMPRON Cylinders in your plant. If you're not already enjoying the benefits of these perennially economic producers you owe it to yourself to investigate their money-making potential. Ask your Udylite man about TEMPRON cylinders or write . . .

the udylite corporation

detroit 11, michigan • world's largest plating supplier



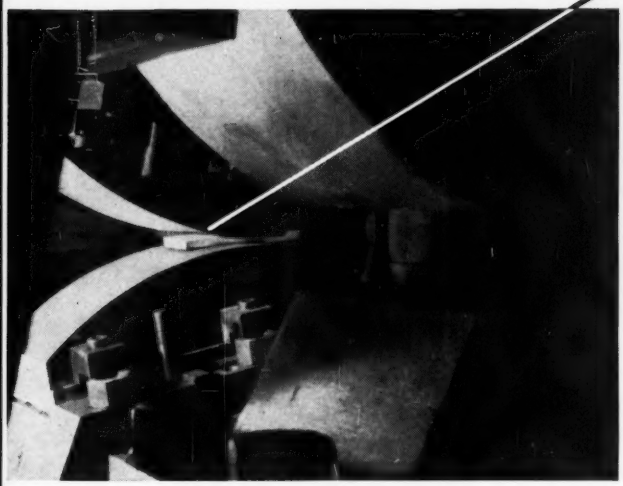
(Opposite)
Rectangular blade blank, withdrawn from electric furnace, is being inserted into automatic blade gripping and handling device.

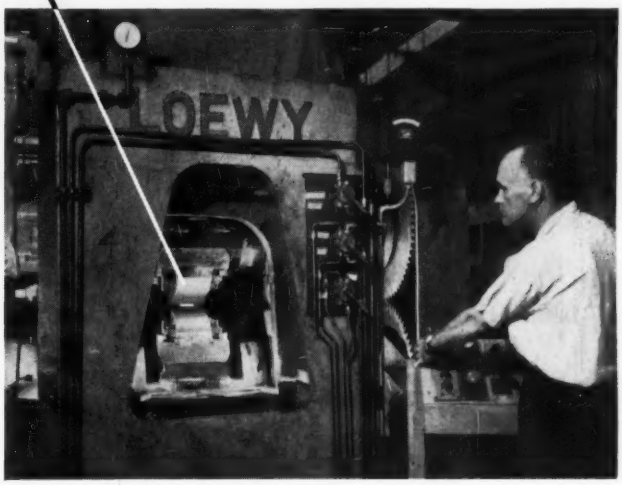
(Below, Left)
Blade blank is pulled through and shaped by oscillating sector roll dies. Two dies, with their lips rolling on each other through arc of oscillating length, impress upon the blank the air foil shape required.

(Below, Right)
At end of rolling process, oscillating rolls open up and rotate back to starting position. Simultaneously the blade handling device returns the shaped blade and releases it pneumatically from grip head. Note spur gear synchronization of oscillating rolls, pressure selector switch, and 2-hand control pulpit.

Blade can be re-rolled for further reduction until final shape and tolerances are obtained, either after re-heat cycle or cold.

WORKPIECE (blade blank)





LOEWY ROLL-DIE forges air foil shapes with up to 40% reduction in one pass!

A 4-stand oscillating roll-die forging installation which shapes high-strength, high-temperature alloys by hot and/or cold reduction is in successful pilot operation at the Tapco plant of Thompson Ramo Wooldridge Inc., Cleveland, Ohio.

Thanks to this new Loewy machine, jet engine compressor and turbine blades up to 7 in. wide and 27 in. long can now be mass produced by plastic forming to close tolerances and with insignificant loss of critical material.

Unlike other machines, which use mechanical drives in rolling, it operates hydraulically. It is designed for both hot and cold forming under adjustable and pre-selected forming pressure up to 1200 tons. Forming pressure is applied lineally across the shape of the workpiece with great advantage over conventional die forging methods.

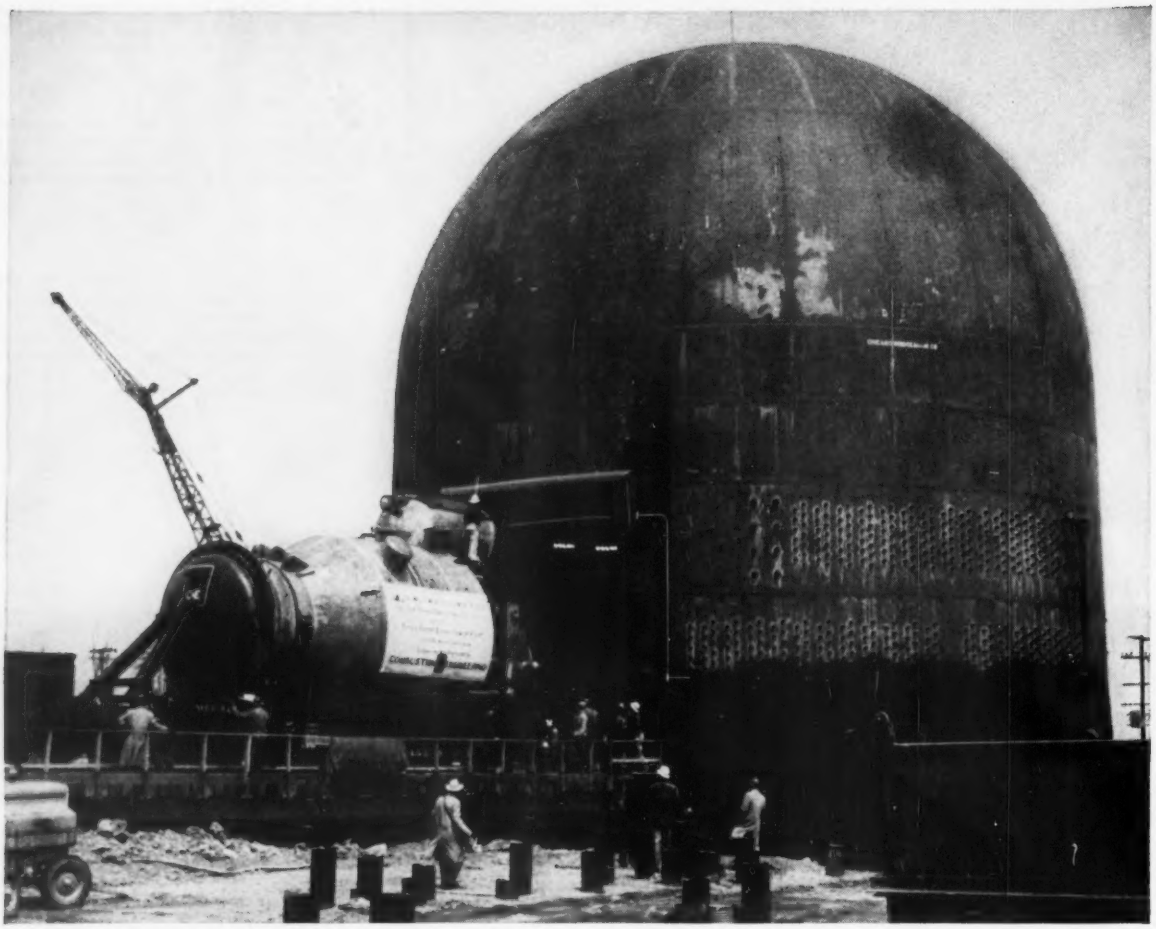
Do you manufacture intricate parts for application in the aircraft, missile or nuclear fields? If so, it is likely that we can help solve any production problems you may have. Write Dept. B-10.

Loewy-Hydropress Division

BALDWIN · LIMA · HAMILTON

111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

BALDWIN BLH LIMA-HAMILTON



Atoms for Peace. This dome houses the 91-ton reactor vessel made of nickel-containing stainless steel for the new Enrico Fermi Atomic Power Plant on the shore of Lake Erie near Monroe, Michigan. Detail design and construction of the reactor vessel was done by Combustion Engineering, Inc. Plant will be built and operated by Power Reactor Development Company from designs supplied by Atomic Power Development Associates, Inc.

Atomic reactor "breeds" its own fuel

Stainless steel vessel must withstand high temperatures and corrosives

The world's largest full-scale nuclear reactor of the "fast-breeder" type is now being built. It may well answer the question:

> *When will atomic power be competitive with conventional methods of producing electric power?*

As the term "fast-breeder" indicates, the atom-splitting process is maintained by so-called *fast* or high-energy particles. It produces more nuclear fuel than it consumes. The fast-breeder actually turns out a kilogram and a fifth of new fuel for each kilogram it burns up!

The "breeding" takes place in a 36-foot high pressure vessel. Here, the high-energy particles (neutrons) travel at speeds of thousands of miles per second to keep the atom-splitting chain reaction going.

Accent on safety. A major objective was to make this reactor vessel safe. That called for a lot of highly specialized work.

It also called for a rugged metal: one capable of withstanding the tremendous heat given off in nuclear fission, and of bearing up under the temperatures and corrosives encountered. The final choice? Strong, corrosion-resisting Type 304 stainless steel. It's a stainless steel that contains Nickel – one of the big reasons for these superior properties.

How to "fast-breed" ideas. Problems involving reactor materials may never be a concern of yours. But you can run into *metal selection problems* involving corrosion, pressures, high temperatures and other destructive conditions almost any time. When you do, remember there is a good chance that a steel containing Nickel will provide the properties you want. Let us help you find out.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

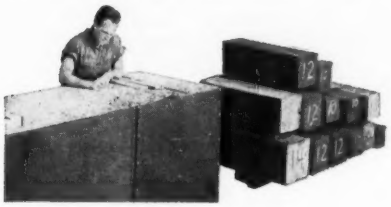
A Smashing Victory for Du Pont

Federal Judge Walter J. LaBuy's ruling that Du Pont may keep its $3.5 billion worth of stock in General Motors Corp. is a sweeping victory for the big producer of chemicals and fibers. It also is viewed by industry observers as a precedent for the proposition that violators of the Clayton Act may keep their acquisitions when divestiture would tend to injure innocent parties. (One of Judge LaBuy's major points was that divestiture would tend to depress GM stock prices.) An appeal by the Justice Department is likely.

Steel Exports Lowest Since 1936; Imports Stay High

Exports of steel mill products dropped to a new low of 51,000 tons during August, bringing total exports for '59's first eight months to only 1.25 million tons. Exports for the full year promise to be at the lowest level since 1936. The steel import rate slowed a little in August as 323,000 net tons were shipped into the U. S. That's 107,000 tons less than the July mark, but still one of the highest monthly totals on record. Imports are now accounting for 55 per cent of our total supply of barbed wire, 38 per cent of wire nails and staples, 28 per cent of wire fencing, 27 per cent of concrete reinforcing bars, 25 per cent of wire rods.

Imbalance in Warehouse Steel Stocks



Since the strike began, warehouse steel stocks have dropped from 3.7 million tons to about 2 million tons—60 per cent of the normal service center inventory. Most popular sizes and gages are in short supply (Page 59).

U. S.: A Nation of Clerks?

One in six employees in the U. S. is a "paperworker," reports Stanley C. Allyn, chairman, National Cash Register Co. And although the nation spent more than $2 billion for labor saving office equipment last year, it still added 200,000 clerks to its work force. About 9 million Americans are officeworkers; their payroll mounted to $32 billion last year. "Revolutionary new techniques are needed to lead the U. S. out of this paper jungle," he declares. He predicts development of machines able to learn from experience. They would be able to figure out the best solution to a given problem without being told what to do.

State Taxes Climb More

In state after state, lawmakers hiked taxes this year—despite a record level of collections, reports Commerce Clearing House, Chicago. Most dramatic example: Pennsylvania legislators boosted the sales tax rate twice in one session; it's now 4 per cent. (Michigan and Washington also have 4 per

cent rates.) Massachusetts, New York, North Carolina, South Carolina, and Utah enacted laws for the deduction of state income taxes by employers from employees' pay checks. Oklahoma also enacted a withholding law, but it was halted pending a referendum, CCH reports. Business and occupation taxes were lifted in Arizona, Michigan, Texas, and Washington.

'Buy American' Act to Get Spotlight in '60

Look for more Congressional interest in reforming the "Buy American" Act next year. STEEL interviews, on Page 60, Robert M. Burr, economic and trade association consultant, and an expert in the field. He thinks there is hope for reform. The problem: How to get the point across to the State Department and the White House that our policies are damaging U. S. firms vital to defense mobilization.

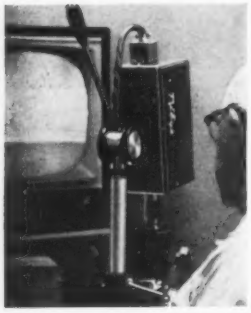
Aluminum Aims at Bigger Construction Market . . .

Aluminum Co. of America is introducing a new product, Alcoa building sheet, aimed at accelerating the use of aluminum in construction. It's being marketed in coils or flat sheets "at prices competitive with galvanized steel," the company reports. It's available in a broad range of widths, gages, and tempers, but offered in mill finish only. However, it may be purchased as stucco patterned sheets.

And Adds Another Auto Market

Pontiac will offer, as optional equipment on its '60 models, aluminum wheels with integral hub and brake drums. Aluminum's high thermal conductivity brings about substantial reductions in brake fade, says Kaiser Aluminum & Chemical Corp.

Look What You Can Do with Closed Circuit TV



It can help you with marketing, training, inspection, interplant or intraplant communications. "We can see TV becoming as useful as the telephone," predicts Teleprompter Corp., New York. Planning sessions between executives in various cities can be held without travel time. Supervisors can be shown problems on the spot—saving time, movement, and money. Many classes can be taught by a single instructor. For tips on costs and applications, see Page 64.

U. S. Cars 'Steal the Show' in Paris

Two American compact cars—Ford's Falcon and GM's Corvair—were drawing the lion's share of attention as the giant Paris auto show got underway last week. That seemed to worry French, German, Italian, and British car-

makers; they're afraid that the new American small cars will bite into their exports to the U. S. The lack of any immediate major growth in the European car market makes sales to the U. S. vital. But long term growth potential is tremendous. L. L. Colbert, Chrysler Corp.'s president, believes Europe's auto market will exceed ours by 1975.

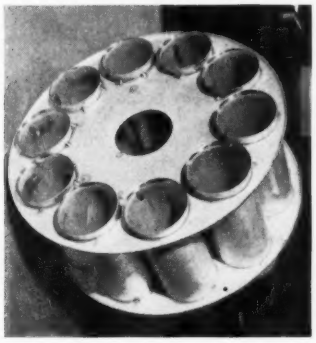
Personnel Costs: Opportunity for Savings

Employee turnover may cost you 500 times the hourly pay of the man you lose. And the investment in a new man can run as high as $20,000 before any return is realized. Absenteeism, misplacement, inefficiency, outdated personnel policies can be as costly as inefficient production equipment. Though it may be hard to detect such losses, the potential savings are so great that you can't afford not to investigate. For tips on where to look and ideas on what to do about the problems you find, see Page 72.

OCDM Will Look Into Transistor Imports

Leo A. Hoegh, director, Office of Civil & Defense Mobilization, ordered an investigation of transistor imports following complaints that the influx of Japanese transistors threatens U. S. production (See STEEL, Sept. 28, p. 84). The Commerce Department reports that Japanese exports of electronic products to the U. S. during the first six months of this year hit $22.1 million—more than during all of 1958 and nearly triple total 1957 imports. Transistor imports during the first six months of this year soared to $521,000 vs. only $7000 during all of 1958.

Aluminum Brazing Paste: Big Money Saver



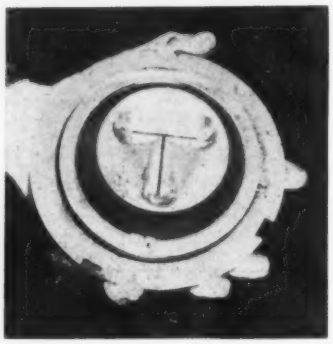
In the picture: The tubes are brazed to two flat sheets; 20 perfect joints are formed simultaneously. The key: Alumibraze, a paste brazing filler supplied in powder form by Handy & Harman, New York. Martin Co.'s researchers have found many production applications for it—enough to save the firm $175,000 in 18 months. Hundreds of assemblies like that in the picture have been dip brazed with no rejections (Page 112).

Foreign Steel Invasion—from Africa Even

The switch in the balance of steel trade, caused by the U. S. strike and the wide difference in production costs in the U. S. and other countries, is permitting even South Africa to ship steel into the U. S. In the past, the country was an importer of American steel products. But so far this year, U. S. consumers have ordered more than $7 million worth of steel—73,400 tons of pig iron and 43,200 tons of flat products—from the little African nation. It has two government owned steel plants operated by the South African Iron & Steel Industrial Corp. Combined capacity is 1.6 million ingot

tons; it will be built up to nearly 2.4 million tons next year. The plants are using ore that is 62 per cent iron. The highest paid African in the plants earns $501.20 a year—about what his American counterpart makes in a month. Wages for whites range up to $2624 a year for a first smelter.

Castings, Extrusions Get Boost in Aircraft Production



This T-section die is the test shape for a steel extrusion development project at Norair, a division of Northop Aircraft Inc. It's playing a role in the aircraft industry's search for better materials. Norair has found that two steel alloys can be extruded about 25 per cent thinner than generally thought possible. And Norair is using investment castings as structural components. Theory: Castings could save dollars and pounds (Page 130).

Electric Trucks Are Back

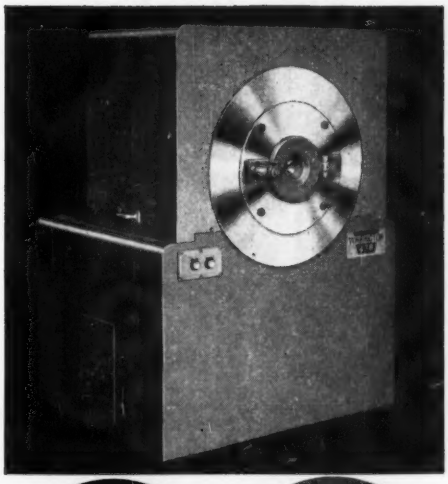
Cleveland Vehicle Co. last week delivered to a Cleveland dairy a truck reported to be the first over-the-road electric truck built in the U. S. since 1933. The firm has orders for 115 vehicles, will build two a day. Maximum payload: 2600 lb. Body: Fiberglas on a tubular steel frame. Battery sizes: 50 mile and 30 mile ranges.

Swimming Pool Makers Bid to Enlarge Market

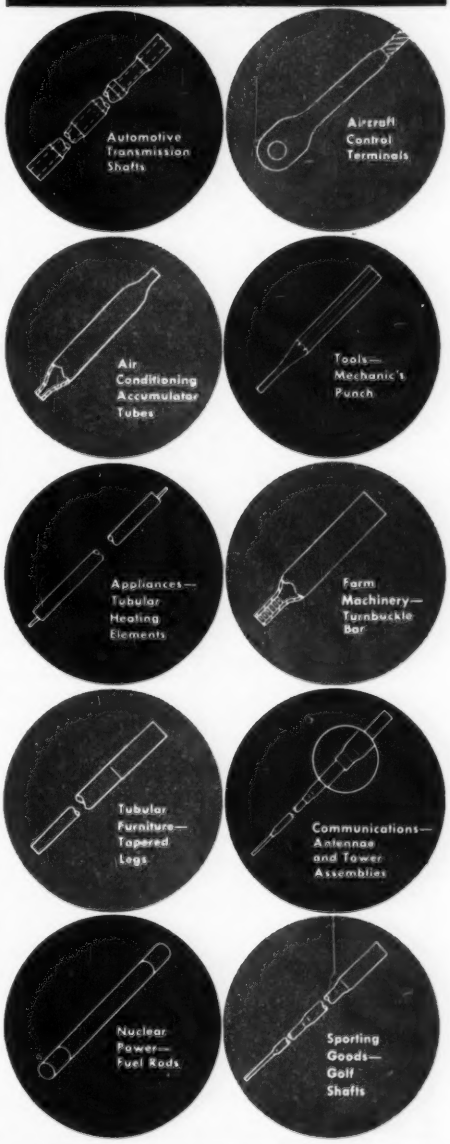
Now's a good time to check into the booming swimming pool industry as a market. Makers of poolside accessories are cashing in on the industry's burgeoning growth. The year's record 70,000 installations will bring the number of U. S. pools to 250,000, reports National Swimming Pool Institute. There were less than 11,000 a decade ago. And makers think the market has been barely scratched. They're pouring $12 million into advertising this year and opening their New York exposition to the public for the first time. Most pools sell for $3000 to $5000; makers are emphasing health, family fun, and increased property values in their drive to enlarge the residential market.

Straws in the Wind

Consumer installment credit rose in August by a seasonally adjusted $502 million to a record of more than $37 billion outstanding . . . Bridgeport Brass Co. and the Brass Workers Union Local 24411 have ratified a new two year labor pact at the Bridgeport, Conn., plants, effective Oct. 1. It calls for wage gains of 12 cents over a two year period, plus improved pensions . . . Beech Aircraft Corp. unveiled a six passenger, $120,000, executive transport last week. The passenger compartment is an office . . . Cooper-Bessemer Corp. plans to purchase Rotor Tool Co., Cleveland producer of air tools . . . Chrysler Corp. says its steel and finished part inventories have taken a turn for the worse, partly because of the Twinsburg, Ohio, strike. The firm hopes its stocks will last through this month; it had planned to keep going into late November.



WHAT TORRINGTON ROTARY SWAGING MACHINES CAN DO FOR YOU

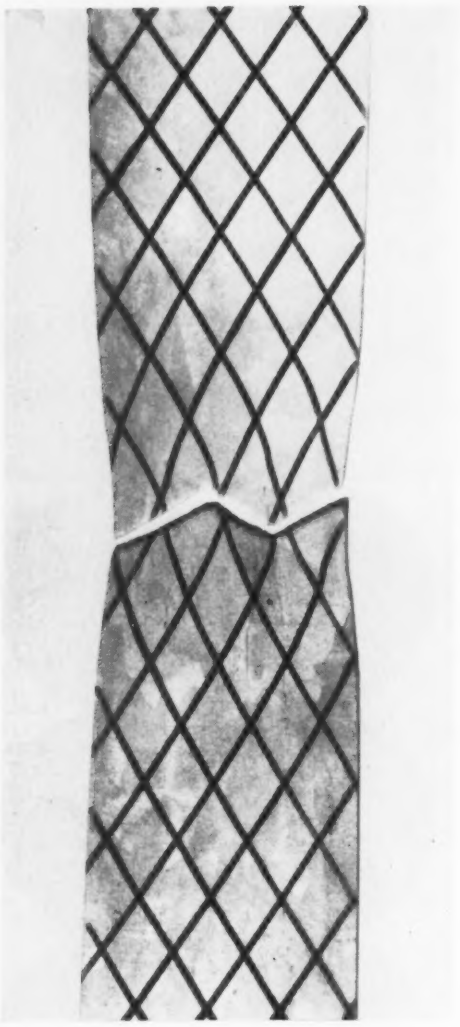


These versatile, efficient machines shape metal parts by hammering between dies instead of cutting stock away. They give you a full pound of parts from every pound of metal. They also save you time and labor. Swaging is usually the fastest way to point, taper, reduce or bond metal parts. Tooling is simple and surprisingly inexpensive.

There is no greater authority on swaging than Torrington. Torrington pioneered the swaging process, designed the original equipment and has constantly improved it through innovations in methods and engineering. Today, Torrington operates more swaging machines than any other company in the world. The experience of our engineers is unparalleled. We maintain experimental shops to help you solve your special swaging problems. If you have a part that can be swaged we can design and produce "Job-Tested" dies to your specifications. Come to Torrington with your swaging problems—we have the answers. The Torrington Company, Swaging Machine Division, 150 North St., Torrington, Conn.

TORRINGTON ROTARY SWAGING

SWAGING HEADQUARTERS, U.S.A.



New steels are born at Armco

70% stretch does not flake or peel coating on Armco ZINCGRIP Steel

Grid-lined specimens of Armco ZINCGRIP® Steel were gripped in the jaws of a tensile tester and pulled apart. Elongation in the fracture zone was about 70 per cent.

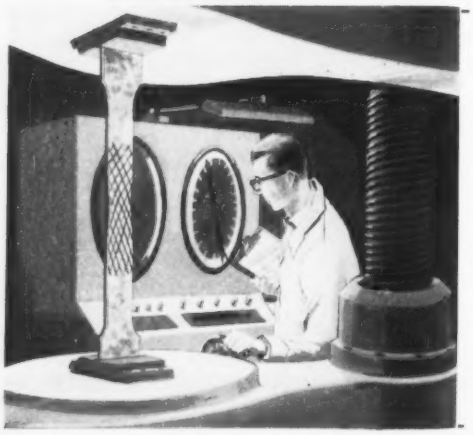
The photo of a typical specimen shows what happened. The rust-resisting zinc coating *stretched* right to the broken edge. It also shows what *didn't* happen. The tight zinc coating did not flake or peel at the fracture line when the base metal gave way.

Proved by performance

Laboratory tests only confirm what fabricators throughout the country have known for almost a quarter-century. ZINCGRIP's coating is ductile. In drawing, forming, piercing, bending and stamping it will not flake or peel.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation



Fill in and mail the coupon for more information on workable Armco ZINCGRIP Steel—the steel with the rust-resisting coating that **stays on.**

ARMCO STEEL CORPORATION
3279 Curtis Street, Middletown, Ohio

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Needed: Human Engineering!

In this complex era in which we live, too many companies are overlooking the need for better human engineering.

In studying the changing role of metalworking managers (Page 101), STEEL's editors find that the metalworking industry has done a relatively good job of keeping pace with technological changes relating to its production processes and its products.

It has done a relatively poor job of building an effective management organization.

Too often, an ambitious and successful district sales manager is moved to fill a spot in the home office. While he is terrific at customer contacts and booking orders, he is a flop at co-ordinating marketing and supervising a sales force.

Just as often, an engineer with his eye on more money plumps for a job on sales. The company loses a good engineer and gains a poor salesman.

Even higher up the line, executives well suited to their present jobs are shifted into positions that are over their heads. Sadly enough, the results sometimes can be read in the obituary columns.

The answer, of course, is in placing people in jobs for which they are best suited. People, as differentiated from machines, have thoughts, egos, conflicting emotions, and varying aptitudes.

Through the application of human engineering, those characteristics can be evaluated and harnessed to make the individual a more effective member of the management team.

Irwin H. Such
EDITOR-IN-CHIEF

We make them all!

• Here are two examples of washers produced in our plant. The one in the tweezer is used in small electric units. The other is used in the assembly of heavy-duty materials handling equipment. And, here's an amazing comparison: It would take more than 12,000,000 of the tiny washers to match the weight of the BIG washer!

This gives you some idea as to the magnitude of washers covered by our inventory comprising over 100,000 dies which are at your service. What's more, you don't pay one red cent for the use of existing dies. Or, special dies can be made in our own plant to fill your specific requirements. *Moreover, you can count on excelled quality and competitive prices from the world's largest producer of washers.*

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Will T-H Slowdowns Hit Steel?

STEEL INDUSTRY officials fear poor productivity when the workers get back on the job.

"We hope our alarm is unfounded," one president told STEEL, "but we remember what happened when President Truman seized the mills back in 1952. Production in some of our departments was off as much as 65 per cent. You couldn't see the slowdowns as the men worked, but they appeared when we got the figures."

• **Who Wants T-H?**—The company president's reaction was typical last week as STEEL posed this question when the Taft-Hartley injunction appeared imminent: Can T-H break the impasse? The union thinks definitely not. Industry is skeptical, but sees no other course.

Besides the concern about slowdowns, the companies dread the expensive possibility of having to shut down again after 80 days. They also worry about long term effects on employee morale.

• **Minority View** — A minority in steel management discounts reports about slowdowns and low morale as "union inspired." They believe workers' wives will see that the husbands try for those incentive payments. "Our men need the money, and many had just barely recovered financially from short weeks and layoffs in the 1958 recession," says one manager.

The optimists also point to the excellent productivity for the six weeks before the strike began on July 15. Normally, that period is typified by slowdowns, but little evidence of them turned up in June and early July.

• **Labor Threats**—Officers of some of the more militant steelworker locals have threatened slowdowns if T-H is invoked. Emil Mazey, secretary-treasurer of the United Auto Workers, has gone so far as to tell presidents of AFL-CIO unions that they should order slowdowns if steelworkers are forced back to their jobs by the courts.

T-H procedure (STEEL, Sept. 28, p. 77) is to appoint a board of inquiry to report to the President. Mr. Eisenhower then asks the attorney general to seek a court injunction. When the court grants the injunction, a 60 day period elapses during which collective bargaining must continue. After 60 days, the workers vote on management's last offer in a secret ballot supervised by the National Labor Relations Board. NLRB must announce the results within 20 days after the 60 day initial period. If the vote is for the offer, the crisis is over. If not, the strike starts again. In that event, the President presumably would go to Congress for legislation to solve the emergency.

• **Management's Offer** — The steel companies' last offer before the collapse of talks on Oct. 5 was this: Improve pension, insurance, and Supplemental Unemployment Benefits the first year of a two year contract and increase wages the second year—by amounts ranging from 6 cents for the lowest job class to 12

cents for the highest. The package would amount to an increase of about 2 per cent per year of total employment costs which before the strike amounted to $3.70 per hour.

In return for that, the companies retained three of their key demands for contract changes. They would give the companies greater flexibility in changing local work practices, disciplining wildcat strikers, and changing work schedules.

• **Demands Softened** — But even those demands had been softened. For example, the wildcat strike proposal no longer had the stipulation that wildcatters who were not fired for their action would lose a day of vacation pay for each day of unauthorized walkout.

The companies conceded that their proposal would have reduced steelworkers' takehome pay by about 2.5 cents a hour in the first year of the agreement because employees would be required to match increased company contributions to insurance programs. But management said it would consider alternate means "to obviate the loss of takehome pay." The workers would keep the 17 cents per hour they have gained under a cost-of-living clause in the old contract, but that clause would be dropped in the new agreement. The union rejected the whole proposal as "ridiculous."

• **If Recovery Is Normal** — That led to the stalemate and the imminence of T-H. If fears of poor productivity are groundless, steel mills will need, on the average, six weeks from the time of work resumption to hit 90 per cent or better of their shipping capacity. They'll need 30 days to reach that rate of ingot capacity.

Look for more severe shortages, generally, for the first 30 days after the reopening than during the walkout. In ten days after the end of the stoppage, expect the start of shipments on orders placed just before or early in the strike. It would take 90 days of operation to fill most of the orders placed just before or during the strike. After that you could expect the start of deliveries on orders placed at the time of work resumption.

• **Users' Plight** — Steel shortages are taking an increasingly heavy toll. Inventories have fallen from a record high of 26 million tons last July 15 to a working minimum of about 12 million, and many are out of balance. The most acute scarcities are in flat rolled products, heavy plates, wide flange beams, bar size angles, large rounds, and alloy bars.

Walkouts Plague Contract

Wildcat walkouts reached a high of 788 during the three years of the last labor contract despite an agreement prohibiting them. Republic Steel Corp. alone had 170 wildcat strikes.

Thomas F. Patton, president of Republic, commented that stronger disciplinary provisions against violators should be written into future labor agreements.

Principal causes for the unauthorized walkouts: Grievance issues and changes in working practices.

Strike Losses

(Through Oct. 12)

Lost Steelworker Wages

$926,000,000

Lost Sales

$2,688,000,000

Lost Production (ingot tons)

25,479,000

Other Losses

Overhead, depreciation, and salaries of nonproduction workers in steel.

$512,000,000

Tax Losses to U. S.

$585,000,000

Phoenix Mill to Be Built by British

PHOENIX STEEL CORP. has received an offer for a $44 million contract from a group of British firms to build Phoenix's proposed new steel mill in New Jersey. The plant, with an annual oxygen conversion ingot capacity of 800,000 tons, will be located on the east bank of the Delaware River in Burlington and Florence Townships, N. J.

The British offer was revealed in a letter to holders of Barium Steel 5½ per cent convertible debentures, due in 1969. The company must have the consent of two-thirds of the debenture holders to modification of the indenture before the contract offer can be accepted. About 77 per cent of the required consents has already been obtained.

Payments during the construction period of two years have been arranged to be paid out of available company funds and company banks. The British interests will require first mortgage on the new plant as primary security for the remaining indebtedness, which will be repayable during the five years after completion of the plant.

Can Warehouse Stocks Recover Fast?

STEEL SERVICE CENTER stocks have dropped 1.7 million net tons (46 per cent) since start of the strike. The decline: From 3.7 million tons in July to about 2 million tons now, 60 per cent of normal (3.4 million tons).

For 13 weeks, stocks have been drained at an average weekly rate of more than 130,000 tons, surprisingly slower than was anticipated.

• At that pace, reserves appear to be adequate for another 13 weeks or more, even allowing for acceleration in demand from here on.

But there's a catch in that comforting prospect—the over-all stock position (2 million tons) doesn't mirror the inventory picture in depth. What really counts: The status of products and sizes.

Authoritative data are lacking, but stocks vary widely in terms of product, type, size, and classification. Some distributors are cleaned out of certain products and hold only fair stocks of others. Even where tonnages seem comfortable, popular sizes and gages are exhausted.

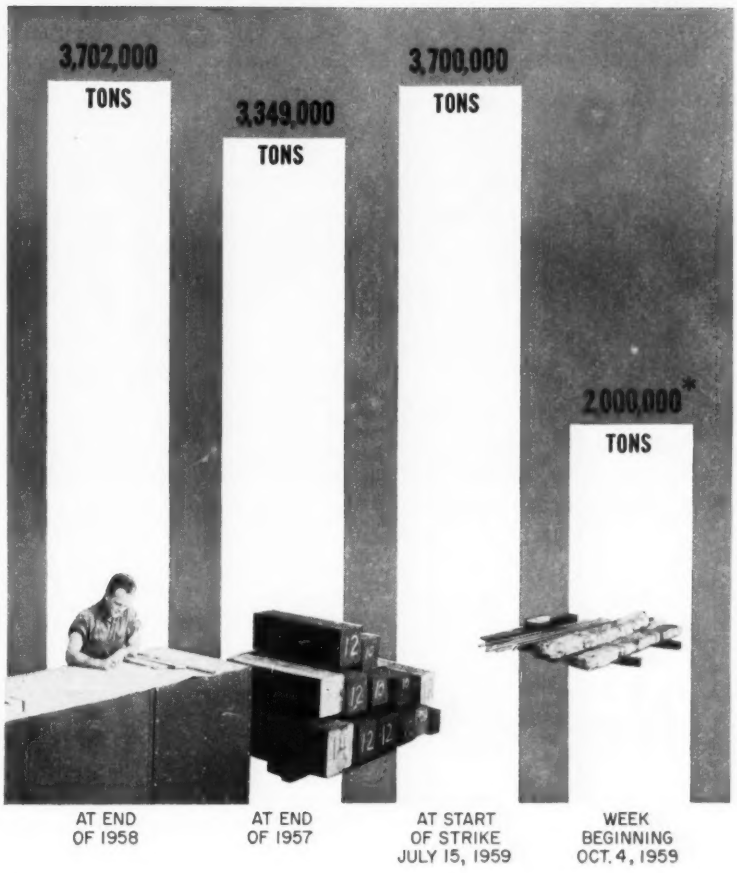
• The flat rolled products are particularly hard hit.

Galvanized sheet inventories are critically low. Marketing experts estimate warehouse stocks have dropped at least 70 per cent since the strike's start. They think inventories of hot and cold rolled sheets are down more than 50 per cent; plates, shapes, and bars (including cold drawn) probably 35 per cent; alloys around 30; tubular goods 25; stainless steel 25; miscellaneous items 40.

You can see that the strike's impact has been greatest on flat rolled, a classification that makes up a large proportion of the service center product mix. But other major products (bars, plates, shapes) haven't fared much better.

• Complicating the situation is imbalance in geographical distribution of reserves.

The Midwest feels the supply pinch more acutely than most other districts. Also, there's no uniformity in the stock positions of distributors. A substantial share of stocks is immobilized in strikebound warehouses. For example, only eight of a national chain's 18 plants have been operating.



*Estimated.

• Stock replacement patterns of previous strike years provide little basis for charting the poststrike buildup.

In 1952, prestrike intake averaged 1,241,289 tons monthly, while the poststrike average was up 7 per cent to 1,325,708 tons. The monthly average for the year (including the 55 day strike) was 1,101,391.

Prestrike intake in 1956 averaged 1,534,783 tons monthly, but poststrike receipts were off 11 per cent to 1,361,305 tons. The year's monthly average was 1,396,124.

This year, prestrike intake averaged 1,389,856 tons monthly. Intake in July (the strike started in the middle of the month) was only 846,202 tons, and receipts in August and September were much smaller.

• Warehousemen generally think supply relief will develop slowly for a month or so after the settlement.

It's thought that service center supplies will be in pretty fair shape within three months after operations are resumed. It's figured: On the basis of a 2-million-ton inventory now, minus outgo at the strike period rate of around 130,000 tons weekly, last quarter intake must average only 1,036,000 tons monthly for the distributors to accumulate a normal stockpile of 3.4 million tons by early 1960. However, it'll take longer to overcome the severe imbalances in certain products, notably the flat rolled items.

U. S. firms are defenseless . . .

in competing with foreign wage rates for federal contracts . . .

Needed: 'Buy American' Act Reform

REFORM of the "Buy American" Act may become one of the big issues affecting metalworking in the next session of Congress which starts in January. The act is certain to get attention because it has a natural appeal to voters in a big election year: It is designed to protect American business and labor from unreasonable inroads of foreign manufacturers into the procurement of products and materials by the U. S. government.

• **Turbine Background** — The act has made headlines this year in the competition between U. S. turbine manufacturers and foreign builders for several large contracts from the Tennessee Valley Authority and the Army Corps of Engineers.

Three situations of importance to metalworking developed: 1. Foreign builders underbid U. S. firms as much as 30 per cent. 2. The principle of awarding the contract to an American company (despite its higher bid) for national security reasons was established in one case, dropped in another. 3. To underbid a foreign manufacturer, one U. S. firm decided to go overseas for up to 50 per cent of the work on one contract.

The hydraulic turbine makers, along with the U. S. machine tool industry and the manufacturers of transistors, generally claim that such imports: 1. Weaken the mobilization base. 2. Destroy a domestic industry vital to the whole economy. 3. Threaten a shortage of labor skills in these fields.

• **Expert Speaks**—STEEL asked Robert M. Burr, economic and trade association consultant to assess the importance of the "Buy American" Act to all metalworking.

Originally, the act was an antidepression measure. In 1954, the President put a differential on bids that favor foreign firms. Contracts are not awarded to U. S. firms when their bids exceed those of foreign firms by more than 6 per cent. (An additional differential of 6 per cent is allowed if the plant is in a labor surplus area.) Before the 1954 Executive Order, the differential had been 25 per cent. The original act did not state a percentage differential. It talked of costs deemed "unreasonable" or not in the best interests of the American public.

• **Q: Mr. Burr, what industries can be affected by the workings of the "Buy American" Act?**

A: Spending by the federal government for supplies and materials accounts for over 11 per cent of the gross national product. That compares with about 3.5 per cent when the act was passed in 1933. Those purchases influence the entire structure of the economy. Certainly they affect all the primary metals directly, or indirectly through federal purchases of finished products containing metal. Industries

as long as the "Buy American" Act is in its present form . . .

says Consultant R. M. Burr

in 1960

most directly concerned include hydraulic and steam turbines, heavy electrical equipment, diesel engines, optics, instruments, and scientific apparatus.

• Q: What can the U. S. firm do in competing with foreign manufacturers for a U. S. government contract?

A: Frankly, the American company is defenseless. The purchase of finished articles from foreign firms has caught the most attention. What about the materials and components being bought overseas to be included in the final "American-made" product? Baldwin-Lima-Hamilton, as you have reported, reluctantly went overseas for some work. Steel castings, forgings, machined parts, and other components of hydraulic turbines are involved.

• Q: How would you describe the present climate of opinion on the act?

A: The needs of our friends overseas generally obscure the corrective action needed to relieve the impact of foreign economic policy on American industry and its ability to compete in its own markets with foreign wages.

• Q: Would you say it is a matter of wages then?

A: Yes, wages, plus a unique system of competitive capitalism. American manufacturers must compete against each other for consumer dollars, knowhow, manpower, machines, and materials. That interaction has led to our high standard of living, but it has also left American companies and their employees vulnerable to competition of low wage economies, and particularly so, as foreign countries adopt the same production techniques which we have developed.

• Q: What should the unions' attitudes be?

A: The rank and file worker has a bigger stake than management. His job and livelihood are at stake. Management can move a plant easier than the ordinary worker can leave his home. Indeed, it is unfair for business not to expose its workers to the problem so they have the opportunity to defend themselves.

• Q: Would you describe yourself as a complete protectionist?

A: No American manufacturer has any reason to complain or seek government preference if his product is inferior to the foreign product and if the needs for the superior product can be fully justified. But to use substandard wages as a determination of federal procurement is wrong.

• Q: Product specifications mean a lot in competing with foreign firms for U. S. government contracts, don't they?

A: Federal specifications are drawn up to protect the government. However, familiarity with American products sometimes causes trouble if the agency tends to make general specifications which the foreign firm can meet, but which are not specific enough to guarantee the American turning down the foreign bid. Federal specifications also need to be refined to require foreign producers

to maintain adequate repair facilities here.

• Q: What is a logical way to approach Buy American Act reform?

A: In evaluating the reasonableness of costs of American bids, the government should use a differential that will take into account and equalize the difference in wages between those paid in the U. S. and the countries of the foreign bidders. Such a policy could be put into effect immediately. It is administratively feasible and available from the United Nations and our government. This policy would put pressure on foreign producers to submit proposals to our government which will more closely reflect the substantial advantages which they gain by producing in low wage economies. It would replace the present policy which encourages and rewards labor exploitation overseas.

• Q: Is such reform in line with basic American policy?

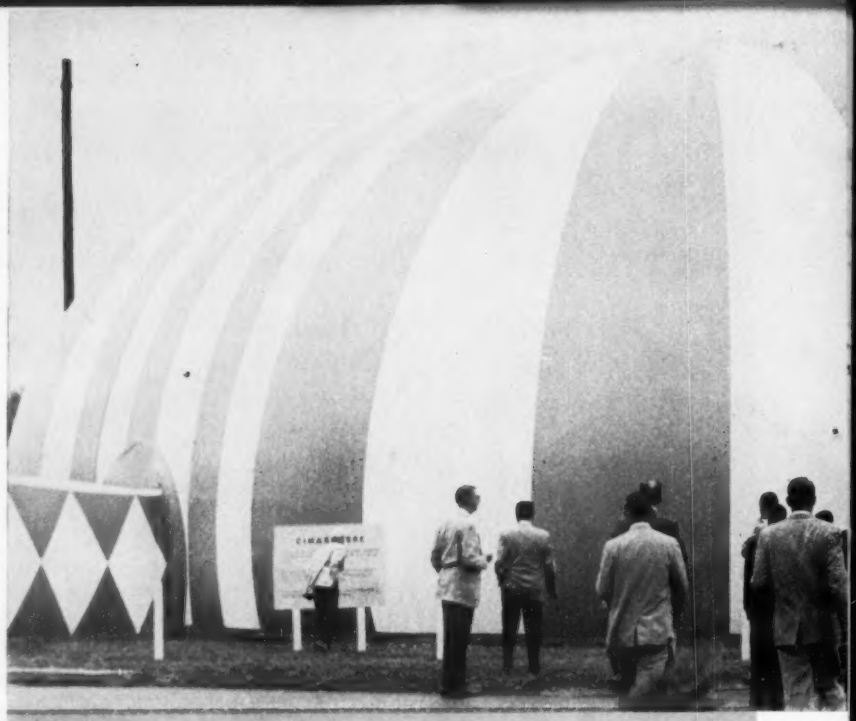
A: Yes, it would place the burden of responsibility directly on the foreign manufacturer. It is our policy to promote higher standards of living overseas. By awarding contracts on the basis of cheap labor, the government is condoning something it says it abhors. By allowing premium profits, it is also helping to kill the incentive for producing goods at cheaper costs abroad.

• Q: How do you evaluate the stand of the State Department and White House?

A: They are excessively exposed to the influences of diplomacy and tend to bend over backwards to do good. The federal government is sidetracking the needs of the individual for the over-all purpose of promoting good will overseas. There are necessary and important exceptions to any general policy. We cannot afford to be "big brother."

• Q: Do you expect a reasonable solution to these problems?

A: I have hopes. It is as reasonable for the government to start importing low paid foreign personnel for government offices as it is to import foreign labor through the purchase of foreign made goods. Direct and indirect labor importation has the same economic impact and public policy implications.



Visitors previewed Cincinnati Milling Machine Co.'s new equipment in this air-inflated, bubble tent as part of the company's 75th anniversary celebration

Machines Do New Jobs

A NEW LINE of lathes which even manages to undercut inflation was among the 20 machine developments unveiled last week by Cincinnati Milling Machine Co., Cincinnati.

New Hydrashift lathes, featuring spindle speed preselection and minimum handling time, are priced at $4575, $512 under comparable 1950 models. Produced by Cincinnati Lathe & Tool Co., a subsidiary of Cincinnati Milling, the lathes were introduced as part of the firm's three week observance of its 75th anniversary.

The company's demonstration, called "Adventures in Progress," is designed to show customers and prospects that its three-quarters of a century represent experience, not age, in the machine tool business. To dramatize its story, Cincinnati Milling employed closed circuit television, moving pictures, a carousel, and a peppermint striped, air-inflated bubble tent to display its new wares.

• Machines in action included seven under punched tape or card control in a numerical control center.

Visitors rode in miniature sidewalk trains past 87 machines under full power. Many revealed radical concepts in design and production technology. Addressing his guests, Chairman Frederick V. Geier cited two axioms: "The U. S. dare not lag in the swift advance of science, technology, and industry. Excessive costs can put the monetary price of survival beyond our nation's reach." The machines demonstrated at the show, he said, are designed to help users hold the line on production costs.

Among the machines premiered:

• A 21 in. lathe made by Cincin-

nati Lathe & Tool which sells in the $30,000 bracket. The tape guided machine is tailored for short lot work, particularly where step turning is involved. In a demonstration, it took 80 seconds to reset it for a new job, including changing both the part and the tape.

• An automatic milling cutter grinder which permits the operator to regrind his own cutters while maintaining production.

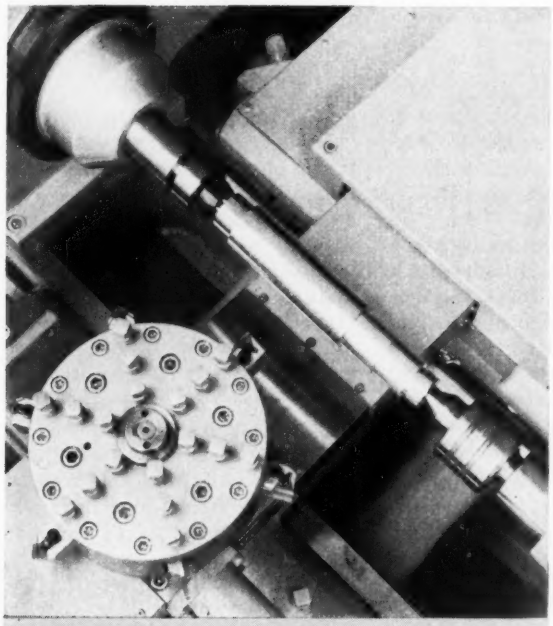
• A new, heavy duty Hydraspinning machine with an independently powered tailstock.

• An all-new general purpose mill which represents a marriage in design between the knee and bed type milling machines. It offers a high degree of flexibility with maximum table rigidity provided by mounting the table and saddle on a machine bed. Vertical motion is supplied by the rise and fall of the spindle carrier on the vertical ways.

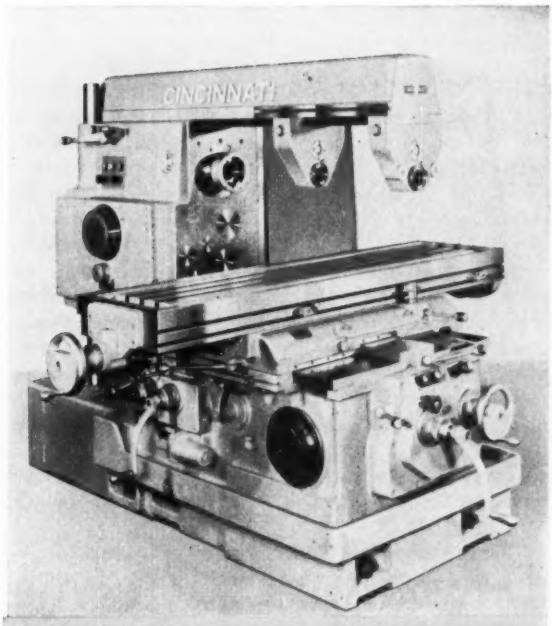
• New Intraforming machines, for working the inside diameters of tubes—the machines are 223 ft long.

• A numerically controlled Model S Bore-Matic precision contour boring and turning machine was shown by Heald Machine Co., Worcester, Mass., another subsidiary. It can generate a wide variety of contour work to tolerances of ±0.0001 in.

• Some of the company's 33 new Elektrojet electrical discharge machines were in action. Sample parts were displayed with holes sunk by the still experimental electrical-chemical machining method.



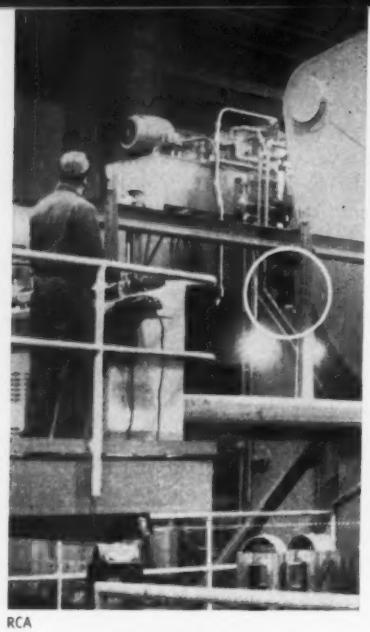
The rotary tool turret on Cincinnati Lathe's new tape controlled lathe holds six cutters. Complete machine cycle is guided by tape, including selection of the tool, speeds and feeds, positioning of the tools, depth and length of cuts



This general purpose milling machine adds the rigidity of a firm bed to the flexibility of a knee type machine. Company engineers say it also has the capacity of a rise-and-fall machine. It's aimed at short lot, rugged cutting production

RCA

INSPECTION



RCA

OPERATIONS

Giantview Television Network

SHOW DISPLAYS

TV for Industry: Uses Unlimited

"THE POTENTIAL of closed circuit television is so great that 90 per cent of its applications haven't been thought of yet," declares a Cleveland distributor. Such enthusiasm is not rare among closed circuit TVmen.

Union resistance to industrial applications where manpower is replaced and in some situations where employees have that "big brother is watching you" feeling have caused some disappointments. But uses in sales, marketing, education, and communications (in-plant and interplant) offer opportunities without such complications.

• **Going Up**—About 18 companies make and distribute closed circuit TV equipment. Sales have climbed steadily, each month better than the last, reports Allen B. DuMont Laboratories Inc., Clifton, N. J. Over 8000 cameras are in use, estimates Philco Corp., Philadelphia.

Electronics Industries Association, Washington, says sales topped $5.4 million in 1957 and $7.2 million last year. One source states sales were expected to reach $12 million this year, but were cut short by the steel strike. Another executive predicts close to $100 million worth of business within three years.

• **Here's Why** — Auto and truck makers are among those who have used closed circuit TV widely to premier new models to distributors and salesmen across the country simultaneously. Such an introduction allows demonstrations often not possible with on the spot promotions and eliminates travel costs and time for many personnel.

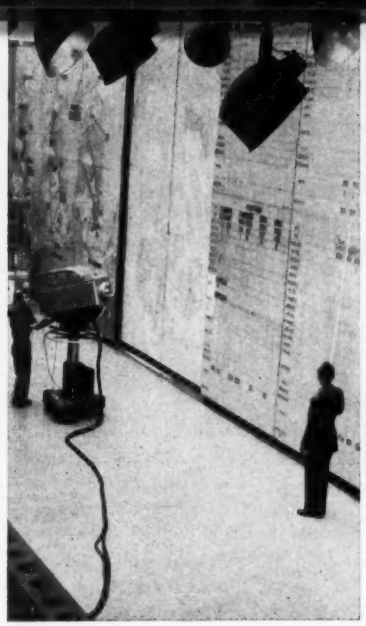
TV turned an acceptance list that ballooned beyond all expectations from a turmoil to a triumph for Owens-Corning Fiberglas Corp.'s comfort conditioned home program. Hotel facilities rented for the occasion could accommodate only 400. The promotion was piped to 1200 in other rooms.

Industrial Plants Corp., New York, used TV to auction 184 lots of machinery to bidders in Chicago and Boston. Cost: $20,000. An average gain of $174 per unit was needed to make up the cost. The U. S. Surplus Disposal Administration auctioned off equipment at three points to buyers in six cities via TV last week. Advantage: Buyers could see the machinery under power.

Udylite Corp. ran a continuous 1½ hour tour of its Warren, Mich., plant and research laboratories for the Industrial Finishing Exposition in Detroit last June via video tape.

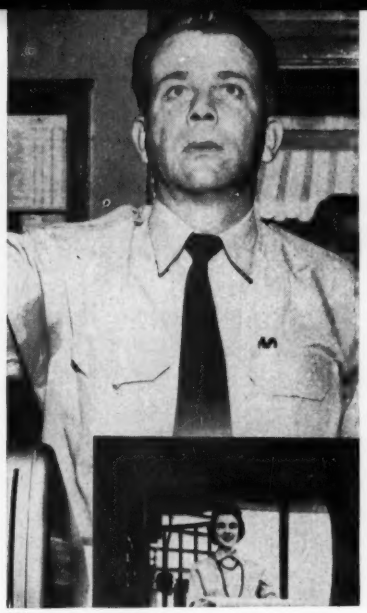
For intraplant and interplant communications, "we can see TV becoming as useful as the telephone," predicts Teleprompter Corp., New York. Supervisors can be shown problems on the spot, saving time, steps, and money. Planning sessions between top executives in various cities can be held at a moment's notice. Jerrold Electronics Corp., Philadelphia, sees TV as a boon to personnel men. During an interview, they can switch on a monitor showing company equipment and say, "Have you ever run this machine?"

Hallamore Electronics Co., Anaheim, Calif., has an in-plant sys-



USAF

COMMUNICATIONS



RCA

SECURITY

Giantview Television Network

DEMONSTRATIONS

tem which it uses, among other things, to introduce new employees and visitors, for talks by company officials, award presentations, and to explain problems (such as how to fill out various forms).

Television is invaluable as a training tool, emphasizes Radio Corp. of America, New York. Many classes may be taught by a single instructor and students have a better view of demonstrations and material than if they were in the classroom.

• **Here's How**—The cost of closed circuit television systems varies widely. Sylvania Electric Products Inc. has introduced a camera at $595 to combat high costs, which Sylvania says has been a deterrent to the industry's growth. A simple pickup system to feed one or more monitors may run as little as $1100; a minimum broadcast chain may cost as little as $4000, states Dage Television Div., Thompson Ramo Wooldridge Inc., Michigan City, Ind. For an intercity setup, American Telephone & Telegraph Co. facilities are used to transmit the picture. Cost: A little over $1.25 per airline mile per hour, plus 16.5 cents for audio; $200 per station connected, and local channel charges (between central office and point of pickup or viewing).

Each setup is tailored, accounting for the great variance in costs. A distributor says: "Why use an expensive arrangement when a more economical one will suffice? At the same time, inexpensive equipment is wholly inadequate for many jobs." He adds: "When buying a system, make sure somebody who knows what he's doing is in on the final decision."

Equipment can be bought, rented, or leased. If daily use is planned, it is probably wise to buy installations. For irregular usage, Giantview Television Network, Ferndale, Mich., says ten operations within a year or two will pay for the system. Philco suggests tax considerations of direct ownership make leasing practical.

• **For How Many?** — Large audiences can be handled with theater type screen setups. (Teleprompter transmits championship boxing matches to theaters in a number of cities simultaneously.) Single monitors vary in size as do home receivers. A 27 in. screen can provide viewing for a maximum of 65 persons.

• **Other Uses** — Television is also gaining in many other applications. Diamond Power Specialty Corp., Lancaster, Ohio, says TV is invaluable to closely observe hot or dangerous work. It is also used to "peer" around corners for remote observation and control of processing operations on rolling mills, shearing machines, critical points on conveyor lines, and on booms, to name a few.

Plants no longer need guards at all security points. A single guard can monitor several points at once. He is also protected against assault, increasing plant safety. Personnel, badges, incoming and outgoing traffic can be checked and handled with television and remote controlled gates. TV is also used to prevent pilferage of plant parking lots, warehouses and other facilities.

Fine inspection work can be enlarged on a TV screen, reducing worker fatigue.

Railroad yards in Alexandria, Va.; Elkhart, Ind.; and Atlanta use TV to identify and register incoming freight cars, reducing the time and number of checkers involved. The freighter *Carl D. Bradley*, sunk in a Lake Michigan storm last November, was identified in 360 ft of water when TV made it possible to read the name on the hull.

Closed circuit television is emerging from its infancy. Despite growing pains, the industry is confident that it will become a highly successful adult.

Reds Must Pay Bills Before U. S. Trades

THERE IS A strong chance that the U. S. will open trade gates to the Soviets if the USSR will honor its debt for lend-lease materials on hand at the end of World War II. In on-and-off negotiations since 1947, we have come within $500 million of an agreement.

Here's a summary of those negotiations: The State Department says the Soviets received $10.8 billion worth of lend-lease up to V-J Day. We do not expect our wartime allies to pay for material used up in the war. Only material on hand at the end of the conflict which was useful in the civilian economy is involved in lend-lease repayment negotiations; we estimated what Russia had was worth $2.6 billion. We offered to settle for half of that valuation—$1.3 billion. The Russians made two offers in 1948: $170 million, then $200 million, payment to be made in 1950. We came back with an offer to settle for $1 billion. The Russian response: $240 million in 1951. We cut our figure to $800 million. The Russians raised their bid to $300 million. Formal negotiations have been lacking since 1952, but with only a $500 million difference and the present state of thaw in the cold war, some Washington observers expect negotiations to be resumed within two months.

One of the arguments over repayment of the whole lend-lease bill is Russia's claim that we settled with the United Kingdom for about 2 per cent of material on hand at the end of the war. We claim it was 22 per cent.

The Russians Have Paid Us Something

The USSR does honor some of its debts. Example: It agreed in 1945 to pay us $222.5 million for lend-lease goods in production, en route, or committed on V-J Day. Payment was to be in 22 installments, beginning in 1945. We were to receive interest from 1946 at a rate of a little over 2 per cent per annum. We have been paid $63 million under that agreement, although annual obligations have not been met to the dollar. The Russians deduct certain amounts each year for various reasons.

The Johnson Act Is a Trade Hitch

Another matter must be settled before trade can be built up. But it may not be as big an obstacle as some think. The Johnson Act prohibits loans to a country in default on its debts to the U. S. If the lend-lease account were settled, there still remains $180 million owed to us by the Kerensky regime (it was overthrown by the Bolsheviks). Of course, there is no hope the Communists would honor the debt, but Undersecretary of State C. Douglas Dillon hints he would ask Congress to make an exception for Kerensky debt, if lend-lease were repaid.

How Much Trade Can You Expect?

If all these "ifs" are wiped out, don't expect trade with the USSR to amount to much in the beginning. Historically, there was little trading even when there were no barriers.

Also, there is no thought of taking down barriers to trade of strategic goods. Mr. Dillon would recommend to Congress that private firms be permitted to extend credit to Russia, so it would be treated tradewise as equal to any other nation (except in the case of strategic goods), and that the ban on fur and crabmeat imports be dropped. Premier Khrushchev has spoken in the past of billions of dollars worth of trade, but Mr. Dillon believes there would be no sudden "dramatic expansion." The Russians are in no position to offer us "really substantial quantities of goods," he adds.

Items that the Russians want from us (in the premier's own words): "We are not interested in buying tractors, harvester combines, planes, and rockets. We want to buy chemical equipment, equipment for engineering, and oil refining plants."

Nike Zeus Contracts Begin to Flow

What may be the biggest missile program of all has at last begun to roll. The Army has awarded a $188 million contract to Western Electric Co. Inc., New York, for research and development on the Nike Zeus antimissile system. Work on the antimissile had been delayed as the services squabbled over the ability of the Army to produce a weapon capable of destroying an ICBM. If the program runs full course, $5 billion in contracts for metalworking may result.

NASA O.K.'s Nuclear Rocket Research

Another forward step has been taken in our space program. National Aeronautics & Space Administration is negotiating with Lockheed Aircraft Corp.'s Georgia Div., Marietta, Ga., "to provide basic engineering data in a continuing feasibility investigation of a nuclear rocket system."

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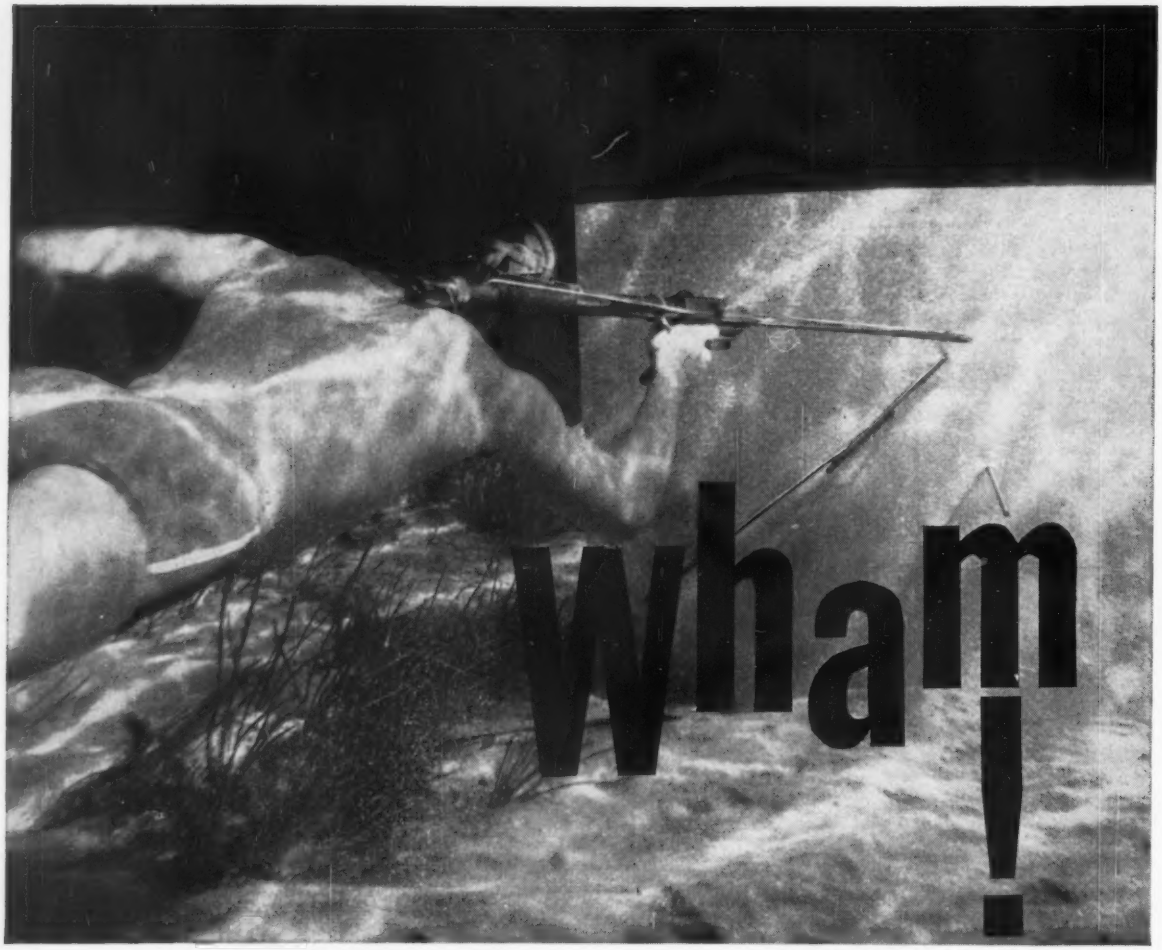


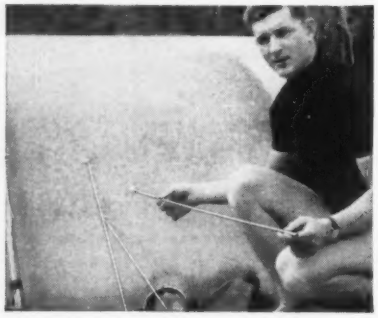
Photograph by famous underwater hunter-photographer Jim Thorne

DEEP SEA HUNTER FAILS TO FLAKE INLAND TI-CO®

More than a match for ferocious 700-pound hammerhead sharks, this compressed-air powered gun fires underwater spears with terrific force. Again and again its high-speed missiles pierced this Inland TI-CO galvanized sheet, yet at the edges around the holes there wasn't a trace of flaking of the zinc coating.

Yes, you can perforate TI-CO sheets. You can subject them to deep-drawing, spin-drawing, punching, crimping, Pittsburgh lock-seaming, in fact the toughest fabricating processes—*but you won't flake TI-CO!*

No wonder TI-CO galvanized sheets are top-choice with manufacturers in such a wide variety of new applications and products. TI-CO is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in gages 8 to 30 inclusive and in widths as great as 60 inches. Specifications, application and performance data, complete information, is all contained in a free TI-CO booklet we'll be glad to send at your request. For your galvanized sheet or coils requirements, consult your Inland representative.



Close-up inspection shows no flaking of TI-CO's zinc coating

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How to Stop Personnel Cost Leaks

A PRODUCTION superintendent from a Midwest factory was brought to company headquarters in New York for a three month training course. Although the company was paying his expenses, he objected to the cost of his hotel room ($16 a day). He inquired about a reduced rate for long term guests, got a "no," and promptly found a better room in a better hotel at $12 a day. He saved his firm around $360.

Since his company calls in about 50 men for extended periods each year, his action pointed up a potential saving of over $18,000 annually.

The saving could have been realized years before if someone had bothered to check the going rates.

The case illustrates: In these Cost Crisis years, management should take a critical look at every item involved in its personnel costs—from seemingly small areas, such as how to write a "Help Wanted" newspaper ad, to the big profit stealers, like turnover and absenteeism.

The whole area of personnel practices is ripe for cost savings. Here are some of the most important:

Here are the Major Areas Where Savings Can Be Made

- Interviewing
- Recruiting
- Testing
- Training
- Turnover
- Absenteeism
- Unemployment Costs
- Manpower Utilization
- Safety
- Labor Contract
- Fringe Benefits
- Communications
- Transfers
- Record Keeping
- Systems and Procedures Analysis

Turnover

Do you know how much it costs when you lose an employee and have to find someone to take his place? Your turnover rate could determine whether you operate at a profit.

Loss of an office employee or semiskilled worker costs an average $400 and up. You may have to spend $4000 to $5000 to replace a skilled bluecollarite, up to $10,000 for a salesman. Some people estimate the labor turnover costs as the hourly pay of the employee multiplied by 500.

The first step to take in controlling your turnover is to keep monthly records, advises the Small Business Administration. By the end of a year or two you'll be able to spot trends. The key figure is the quit rate. As a rough rule, says SBA, if your "quits" exceed 2.5 per cent, you better take a close look at the reasons. Discharges are next in importance.

"Take 0.3 per cent as the danger line there," cautions SBA.

L. O. Sweval, consultant, Profit Counselors Inc., New York, lists these costs involved in turnover:

- Unemployment insurance taxes go up with each rise in turnover.
- Training costs rise.
- Production efficiency drops.
- Scrap and rework costs mount.
- More people, more funds have to be diverted to clerical tasks involved in turnover.
- Expenses for medical examinations and records rise.
- Bigger appropriations have to be made for "Help Wanted" advertising.
- Accounting and payroll costs increase.

Additional expenses include: Recruiting, interviewing, processing applications, checking out references, testing, higher supervision costs, increased inspections.

To cut down on turnover, decide first what's causing it.

Chances are the major reasons will fall into these general categories listed by Stuart R. Smith, vice president, Trundle Consultants Inc., Cleveland: 1. Faulty selection. 2. Lack of job satisfaction. 3. Lower-than-average salaries. 4. A feeling the job lacks prestige. 5. Poor industrial relations.

"In any problem, such as turnover, 10 per cent of the occurrences will cause 90 per cent of the trouble," says John D. Staley, personnel division manager, American

(*Please turn to Page* 72)

NATIONAL ACME'S
"ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES
OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Minneapolis Honeywell . . . an "every day" job for Acme-Gridleys.

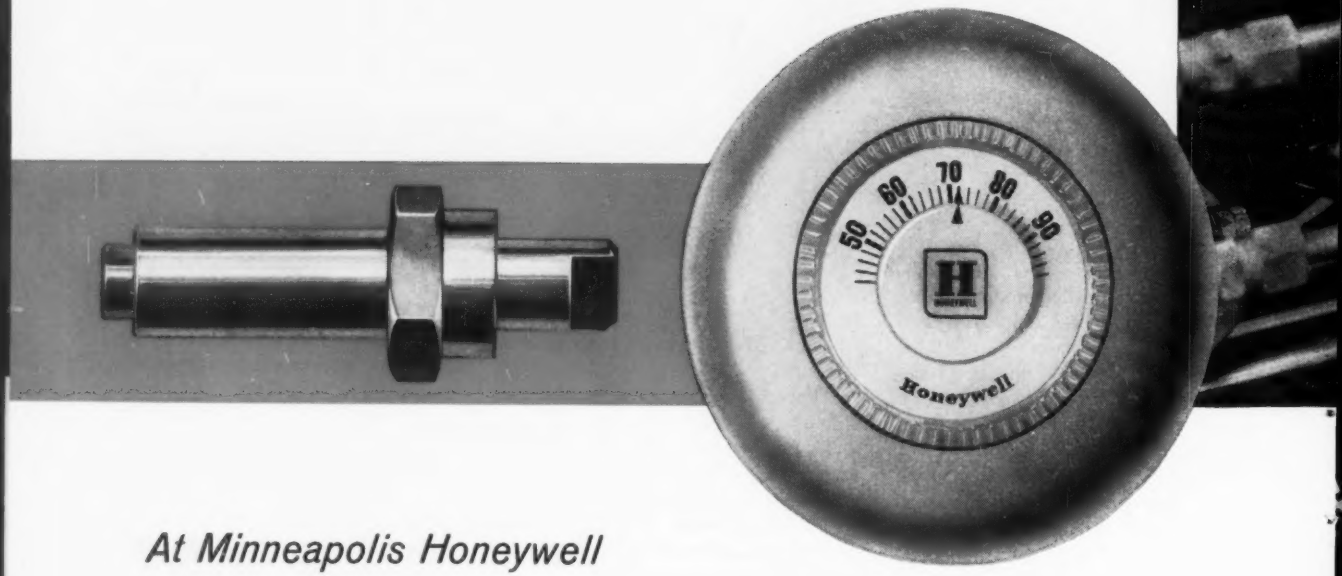
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

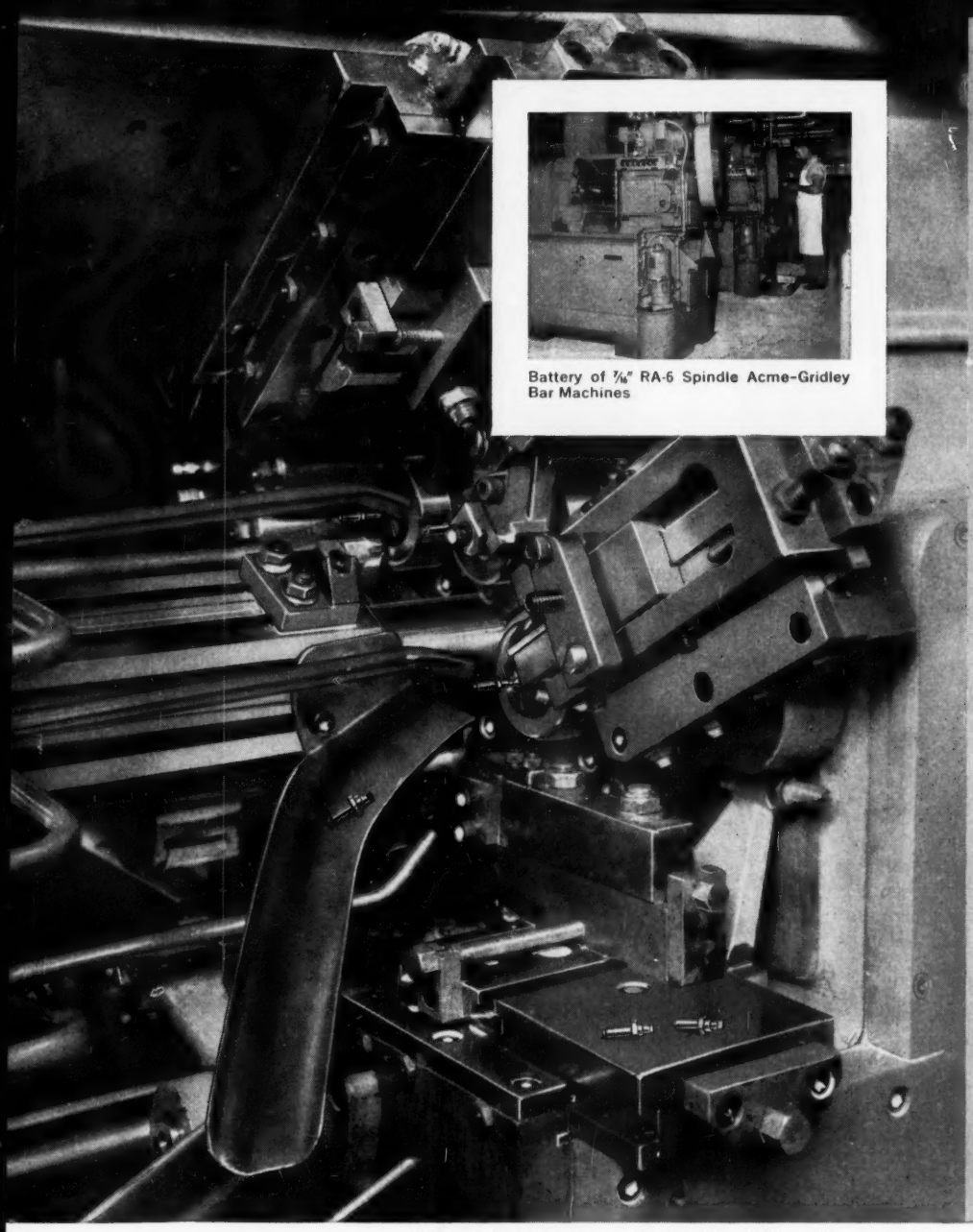
Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



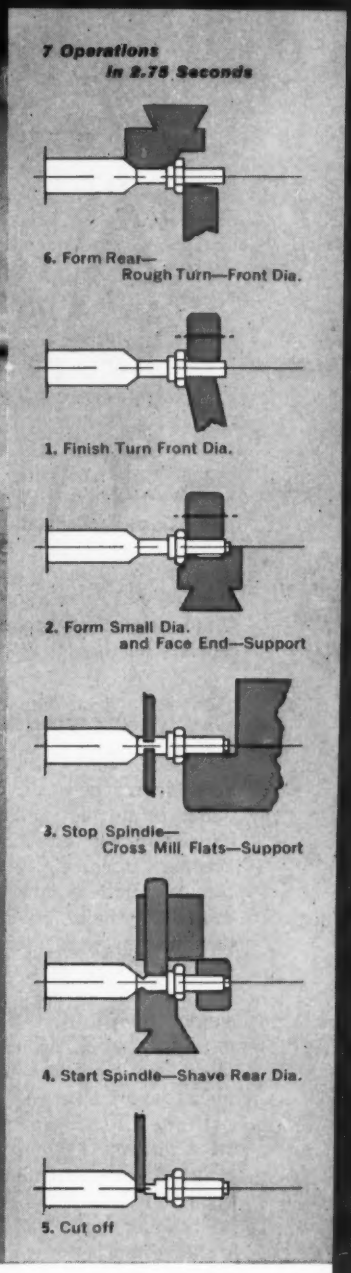
At Minneapolis Honeywell

ONE ACME-GRIDLEY REPLACES FIVE SINGLE SPINDLE MACHINES

. . . Saves 200% in Machine Hours



Battery of 7/8" RA-6 Spindle Acme-Gridley Bar Machines



Close up of tooling zone showing 3rd, 4th and 5th position operations

. . . *in addition* the reject rate is reduced 200% and operator hours slashed 300% in the production of a precision center post component for residential thermostats. What's more, with one machine, one set of tools, and one operator doing all machining in the primary setup, quality control is greatly simplified, and valuable floor space saved. Still further savings result from greatly reduced machine maintenance.

Such drastic savings are possible for Minneapolis Honeywell because of inherent Acme-Gridley features such as independently operated tool slides, the extreme accuracy and flexibility of direct camming, and wide open tooling zones. Rugged and versatile 7/16" Acme-Gridleys fit right in with Honeywell's program of "Total Machine Utilization"; will pay off for years to come by economically accommodating the materials and setups Honeywell requires in the production of small, high quality parts for their precision instruments.

Get the complete story on how Acme-Gridley Automatics provide industry's most modern approach to cost reduction. Call, write or wire.

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Have You Tried Work Sampling

Metalworkers Are Using It to Eliminate Manpower Waste

Work sampling (or ratio delay) is a modern technique to measure the effectiveness and productiveness of your employees. Here's how it works:

The ABC Tool Co. decides to investigate whether it is getting maximum efficiency from its workers. An investigator begins to make unscheduled visits to the 20-man machine shop. He makes notes of what each man is doing at that moment. On his first visit, he finds that five of the 20 men are out of the area. Of the 15 there, only ten are working—the other five are at the water cooler replaying the fifth game of the World Series.

He continues his check of the machine shop—dropping in four or five times each shift every day for a month. At the end of the month he works up a bar chart based on his observations. Findings: At any given time only 50 per cent of the machine shop personnel are actually engaged in productive labor. The company could probably get along with ten rather than 20 men.

The next step is to correct the reasons why only half the force is effective. It may be poor supervision. It could be workers have to chase all over the plant for parts because another department is not doing its job properly.

If the company is smart, it will run a similar study on every department in the plant—bluecollars, whitecollars, executives. It has to watch out for two pitfalls, though: 1. Samplings must be taken at "random" times, varying from day to day. 2. Enough samples must be taken to get a good statistical average.

Management Association, New York. "Find the major causes and concentrate on them."

Absenteeism

Closely allied with turnover is absenteeism. In a survey, the National Industrial Conference Board found among certain companies keeping absentee records: ". . . that a small number of workers caused the major share of absences; that women were greater lost-time offenders than men; that married women had poorer records than single women; that the last work day of the week, Mondays, and the day after payday were most frequent days of absence."

In the NICB report these controls were among the most popular for absenteeism: Attendance awards, good supervision (most important), stimulating job interest through training and better communications, careful checkups by medical department (if company has one), putting the worker in the job he can best do, offering opportunities for advancement, careful recording of absences, disciplinary measures such as layoffs, and as a last measure, discharge.

Employee Selection

This is probably the most vital cost responsibility of the personnel department, says Mr. Sweval, especially when the investment in a man can run as high as $20,000 before any return can be achieved. Because of its many facets, the cost elements are broader than in any other personnel area. Here are the most important:

- Job description and analysis: Probably the most important selection tool. Unless the job is adequately described and analyzed by the line executive, it is almost impossible for personnel to find the right man.
- Recruiting: Costs run high—from an average $12 for a shippingroom packer to $800 for a journeyman machinist. There are ways to trim expenses, though. "Take the case of a small company which tries to emulate a corporate giant," says Mr. Sweval. "It usually finds the costs outweigh results. As a consequence it usually puts out money it could be spending more wisely in other areas." Or why go to the expense of hiring a man 1000 miles away when as likely a candidate can probably be found in your own backyard? And just as you go after the right market for your product, re-

cruit the right type of employee for your operation. Example: A firm researched hiring policies and learned that for detailed, repetitive assembly operations it should hire married women between 30 and 38, with no children, and with no more than two years of high school. The standard increased productivity 14.5 per cent and reduced turnover from 80 to 20 per cent in the first year.

• Testing: Says Mr. Sweval: "In the last ten years, personnel testing has become the vogue in industry. Its values and advantages have been well documented. But personnel management must continually assess the results of these tools—and their cost. Where you have such services as a staff psychologist and battery testing, you must continually measure the company's return on investment. A good guide is the effect money spent has on labor turnover." Test costs may run from $2 to $240. "What we have to do in selecting personnel," says Mr. Staley, "is to take our best performers and measure their physical, mental, and psychological characteristics. This establishes a 'norm.'" To get the best mileage out of your tests, don't think of them just in terms of hiring. They can be equally valuable in training, transfers, promotions.

• Interviewing: Costs generally run higher than is realized. Typical: $10 to $15 for a laborer, $45 for a shippingroom clerk, $125 for a sales engineer. Too few managers know how to interview. One firm found out by losing 46 salesmen in one year (who shouldn't have been hired in the first place). Personnel set up a training program to teach branch managers how to interview. Result: In a year, turnover was reduced from 46 to 16 with an estimated total savings of $450,000 (based on an estimated cost of $15,000 per salesman lost). Management people advise: Interviews take time, which means money. Refine your techniques—base interviews on a planned format.

• Advertising: The trend to more professional employment advertising has had a heavy impact on the costs of selection, says Mr. Sweval. "With more and more companies competing for technical personnel, advertising for the 'right man' has become more important. Hint: A properly conducted institutional advertising campaign can be a plus in "preconditioning" potential employees on the company story.

Other Cost Savers

Here are some capsule suggestions on other areas that offer lucrative opportunities for cost savings:

• Communications: A two way chain of communications from top and bottom can lower accident rates, cut absenteeism and turnover, increase efficiency. One company was able to halve the production costs of a custom item. At the start of the day it gave each workman a sheet detailing the total cost of his operation for the previous shift (even down to a half dozen screws or a 2 ft piece of pipe). But too many personnel departments have gone overboard on communications programs without making a careful study of the costs involved. The house organ, newsletter, employee manual, suggestion system, bulletin board, have too often become communication toys and not tools.

• Fringe benefits: Handled intelligently, the benefit program can stabilize the labor force. Conversely, a "fringe happy" firm can be trapped into long term commitments that may eventually play havoc with its finances (in some cases fringes run as much as 40 per cent of the payroll dollars).

• Records: They can play a vital role in an effective personnel program. Often, though, they become an obsession with personnel management. Result: Forms and more forms adding up to files and more files. Net result: Wasted money and effort. Systems and procedures analysis is a must here.

• Unearthing talent: A modern personnel file may turn up the man you need in your own organization. It may eliminate selection costs, much of the training expenses. Investigate using the older worker. He's generally stable, reliable, accurate, and works with less supervision. One firm got itself a top-notch engineer with a hard-to-find specialized experience because it wasn't afraid to hire a 46-year old.

• Management by default: If your secretary comes in late four days in a row and you say nothing, you have sanctioned something that raises costs, says Mr. Staley.

• Follow-up: A payroll doesn't shrink as fast as it grows. Suppose you buy a new fork truck and eliminate several material handlers. Unless you have a good follow-up program you may still find those people on the payroll months later.

• Unemployment, workmen's compensation: You can hold down workmen's compensation premiums by better safety training, improved checks and controls. The best cure for unemployment costs is to stabilize production.

• Personnel director: One of his main functions should be cost cutting, but too many think of themselves as "the attorney for the employee." Students of personnel say companies really doing a cost cutting job have a businessman heading up the department.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Where Sampling Works

John C. Millikin, manager industrial engineering, Twin Coach Co., Buffalo, says work sampling is most applicable to the type of job where it's difficult to establish standards (such as defensework). The company says it is uncovering many bad work habits that foremen are unaware of even though the practices have been in existence for some time. "You can measure the efficiency of your whole organization through work sampling," says Mr. Millikin.

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By the time you read this, the steel strike may be settled. We sincerely hope so. However, whether it is or not, we can still meet most steel requirements—in spite of current heavy demand.

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Strike or no strike, as always, you can count on Ryerson to maintain its regular policy of fair prices. And as usual we are fully prepared to meet any requirements for aluminum, industrial plastics and metalworking machinery.

Your Ryerson representative is well qualified to review the facts and help you get the maximum for your steel-buying dollars. Ask him to analyze your requirements with you the next time he calls.

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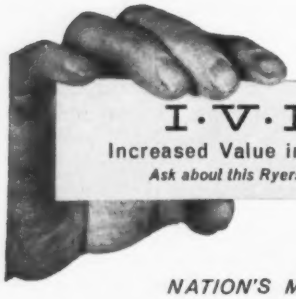

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Why Big 3 Offer 2 Compact Cars

They're covering all bets with a second, slightly more expensive compact vehicle. Chrysler was first with the Dart. Now Ford readies the Comet and GM a yet-to-be-named unit for spring

MORE ECONOMY CARS are on the way. The Big Three still aren't sure which way compact car demand will go, so they're bringing out slightly more luxurious (and more expensive) economy cars for their medium price dealers. Dodge Dart was introduced last week. Ford Motor Co. will bring out its Comet in the spring. Tooling for GM's Buick - Oldsmobile - Pontiac (B-O-P) small car is well advanced.

Official information on the Ford and GM cars is still sketchy. Ben Mills, vice president and general manager of Ford's Mercury-Edsel-Lincoln (MEL) Div., has stated the car will be offered in two and four door sedan and station wagon models. It will have a 114 in. wheelbase and will be 194.9 in. long, says Mr. Mills. MEL's 2900 dealers will market the car. GM hasn't even admitted it has a second small car in the works.

Here's what STEEL has learned:

• **Comet**—This car, designated as the "Edsel-B," will be 54.5 in. high. It's 70.4 in. wide at the rear bumper and 67 in. wide between the center posts. Target weight of the two door sedan is 2451 lb. Tentative introduction is slated for mid-April, about the same time as Falcon's station wagon.

Although the Comet is 15 in. longer than the Falcon, it will be built on the unitized Falcon body shell which will be extended. Some of the extra length is in the trunk area. Falcon's trunk measures 48.3 in. long, but Comet's will be 54.4 in. Preliminary specs from the Automobile Manufacturers Association show 26.6 cu ft of trunk space for Ford's larger economy car compared with 23 cu ft for the Falcon. Informants say the car's quarter panels resemble Mercury's 1960 styling theme. Taillights are similar to the 1959 Mercury's.

Ford is waiting to see how Falcon fares before it firms up prices and production schedules for the Comet. It probably will be built at plants which are assembling the Falcon—Lorain, Ohio, and Kansas City, Kans. Ford's San Jose, Calif., facility will be phased in later. The tentative customer list price for the Comet two door sedan is $2175—based on Detroit delivery plus all taxes, license fees, and dealer charges. Accessories are extra. Prices are subject to change.

• **Resembles Falcon**—Comet's suspension, transmission, wheels, and tires are virtually the same as those of the Ford Div.'s economy car. It will use the Falcon six cylinder engine. Reports indicate it will be bored out slightly, but preliminary Comet spec sheets still show a 144 cu in. displacement and a 3.50 x 2.50 in. bore and stroke. Since dynamometer readings indicate Falcon's engine can turn out more than the 90 hp being advertised, there seems little reason to rebore, but displacement can be increased to 175-185 cu in.

MEL engineers have been testing the Comet under disguised sheet metal. Initially, the car will average 23 to 24 mpg on city-country driving using a manual transmission. The car has an automatic choke instead of the hand type featured in its sister economy car.

Interior dimensions call for an explanation of the statistical legerdemain carmakers sometimes use to prove they have the most seating room. Comet's front headroom is 33.9 in. Rear headroom is 32.8 in. Legroom is 43.3 in. up front; 39.4

ALL 1960 PLYMOUTHS will have aluminum coated steel mufflers and tailpipes as standard equipment. They retain torsion springs and use Chrysler Corp.'s unitized body construction. Station wagon sizes are same as last year's, but sedans are 2 in. longer and 2 in. lower (with five passengers) than the '59s. Other dimensions are virtually the same.

Plymouth offers 24 models in three sedan and three station wagon lines. Chrysler's "Slant Six" economy engine is standard, but five other powerplants are available. Largest is a 330 hp ram induction V-8 for top performance. Four transmissions are available.

Savoy is the lowest price line. Its two door sedan is expected to list close to the 1959 price of $2027, slightly less than the 1959-60 factory list of $2056 on Chevrolet's comparable Biscayne model and the $2051 Ford charges for its 1960 Fairlane Tudor.

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in. in the rear. Those are "free" measurements. They're identical to the "free" headroom and legroom in Falcon and about 1 in. less than Corvair's "free" measurements.

• **Watch the Dummy**—"Free" dimensions are sometimes confused with "effective" legroom and headroom. Effective measurements are taken with 150 lb weights on the seats. They're generally placed in dummies so the companies can get a good idea of how an average size person will fit in the car.

There's nothing wrong with this approach since "effective" headroom and legroom should be more useful to the buyer than "free" dimensions. But you can't accurately compare effective measurements because each company has a slightly different way of locating the 150 lb.

For the true comparisons, you'll want to stick with the "free" dimensions listed by AMA.

• **GM Adds Another**—Best available reports have it that GM's B-O-P small car will be introduced in the spring, about the same time as the Comet. It will be built on a 112 to 114 in. wheelbase and should be 53 to 54 in. high. One curb weight that has been given is 2700 lb, but it may be for the station wagon model.

Assembly plants haven't been confirmed, but B-O-P facilities at Kansas City, Kans., and Wilmington, Del., are mentioned as likely. Actually, GM has designed two smaller cars besides Corvair, but it looks like the corporation plans to put only one into production next year. The other, which is rumored to be for Pontiac, probably won't be built unless the economy cars start biting too deeply into the medium price car market.

Buick Div. has done the engine work on the B-O-P car. It reportedly will be a V-8 aluminum block and will be permanent molded and sand cast. Displacement is 230 cu in. Block tooling has already been released to a Cleveland firm. A second engine, with less displacement, appears to have been shelved.

Unlike Ford, GM plans a separate body shell for its second economy car. It will not use the Corvair body, but it will have rear swing axles like those on Chevy's light car. A Buick designed, fluid drive transmission is programed for the vehicle. Styling has been well guarded. It is known that the B-O-P job generally will follow the basic styling theme established by 1960 Oldsmobiles and Pontiacs.

The car will have its engine mounted in the front. Chevrolet has been touting the advantages of rear engine light cars. Motordom thinks it will be interesting to see how GM's "one big happy family" settles the conflict in its ranks.

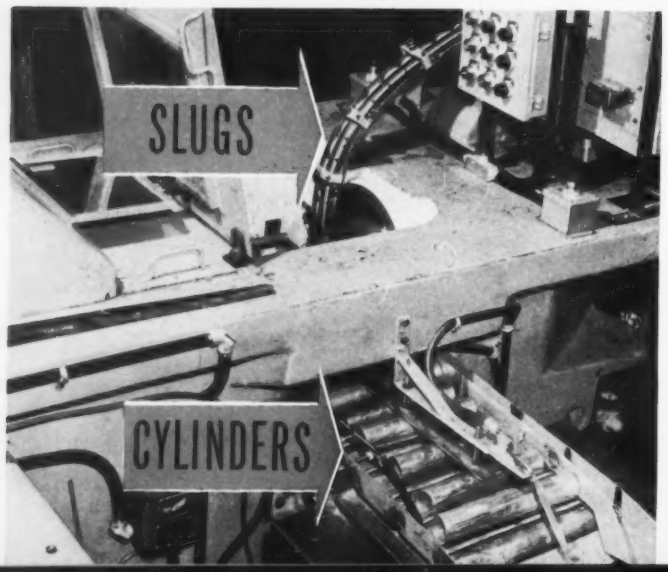
AC Cold Extrudes Speedometer Cylinders

AC SPARK PLUG DIV., Flint, Mich., General Motors Corp., cold extrudes Buick speedometer indicator cylinders on this 400 ton Herlan press. The press has an operating rate of 60 strokes per minute, but the Buick job runs at 35 strokes.

Aluminum slugs, 2⅛ in. in diameter by ¼ in. thick, are hopper fed into the press and pushed through the orifice between the punch and die ring under 250 tons of pressure. Punch and die are preheated to 300° F before starting a run.

The cylinders are trimmed to 13 in. lengths. They're 2⅛ in. in diameter, with a wall thickness of 0.010 in. No polishing or buffing is needed. Spray painting and silk screening are used to finish them. Decals are used on some.

AC says rejects run less than 2 per cent. Slugs are 2-S aluminum and are precast under a continuous casting process. The division buys them already blanked and annealed. They're tumble lubricated with a lanolin-zinc styrate compound and air dried before loading into the press. AC turns out a 10.5 in. long cylinder for Oldsmobile speedometers on the same press.



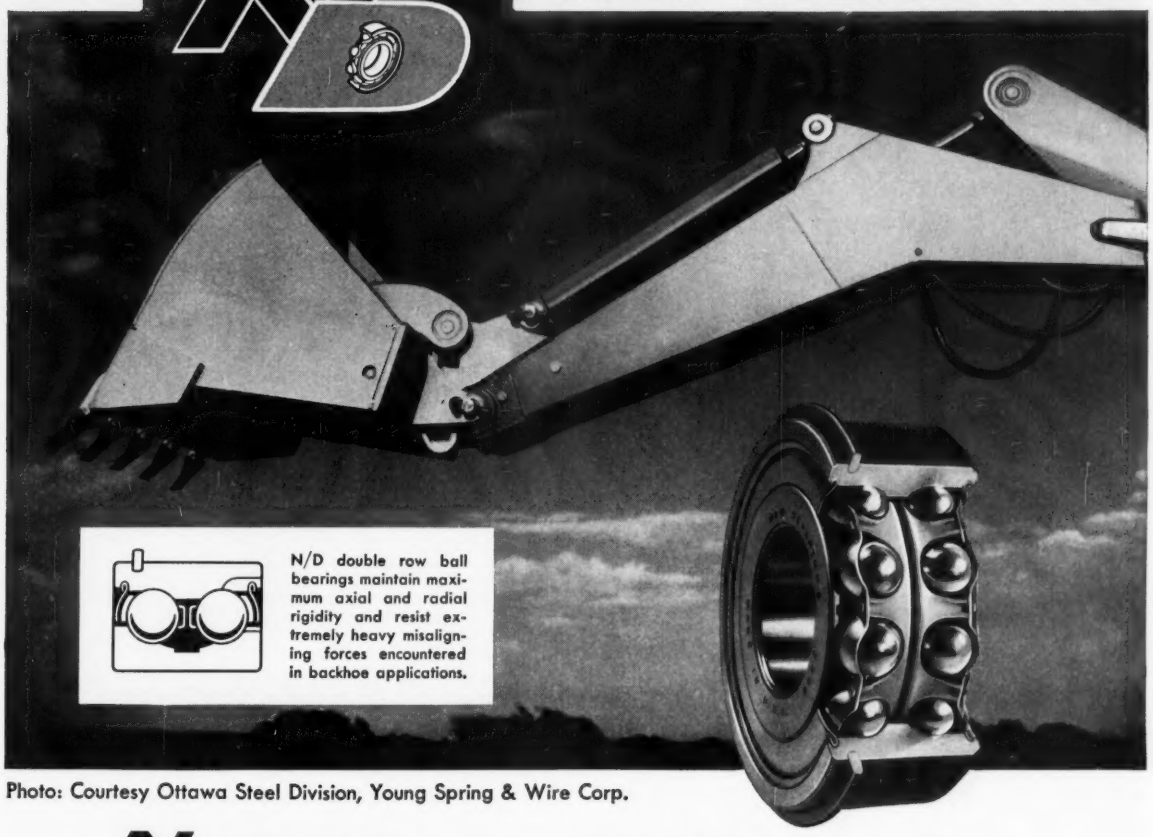
U. S. Auto Output

Passenger Only	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
9 Mo. Totals	4,336,689	2,874,272
October	.....	261,701
November	.....	514,152
December	.....	593,920
Total	.....	4,244,045

Week Ended	1959	1958
Sept. 5	17,261	12,314
Sept. 12	24,364	24,072
Sept. 19	62,716	37,150
Sept. 26	91,341	42,599
Oct. 3	103,527†	34,464
Oct. 10	105,000*	34,834

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

CASE HISTORIES



N/D double row ball bearings maintain maximum axial and radial rigidity and resist extremely heavy misaligning forces encountered in backhoe applications.

Photo: Courtesy Ottawa Steel Division, Young Spring & Wire Corp.

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Replacement ball bearings are available through United Motors System and its Authorized Bearing Distributors.

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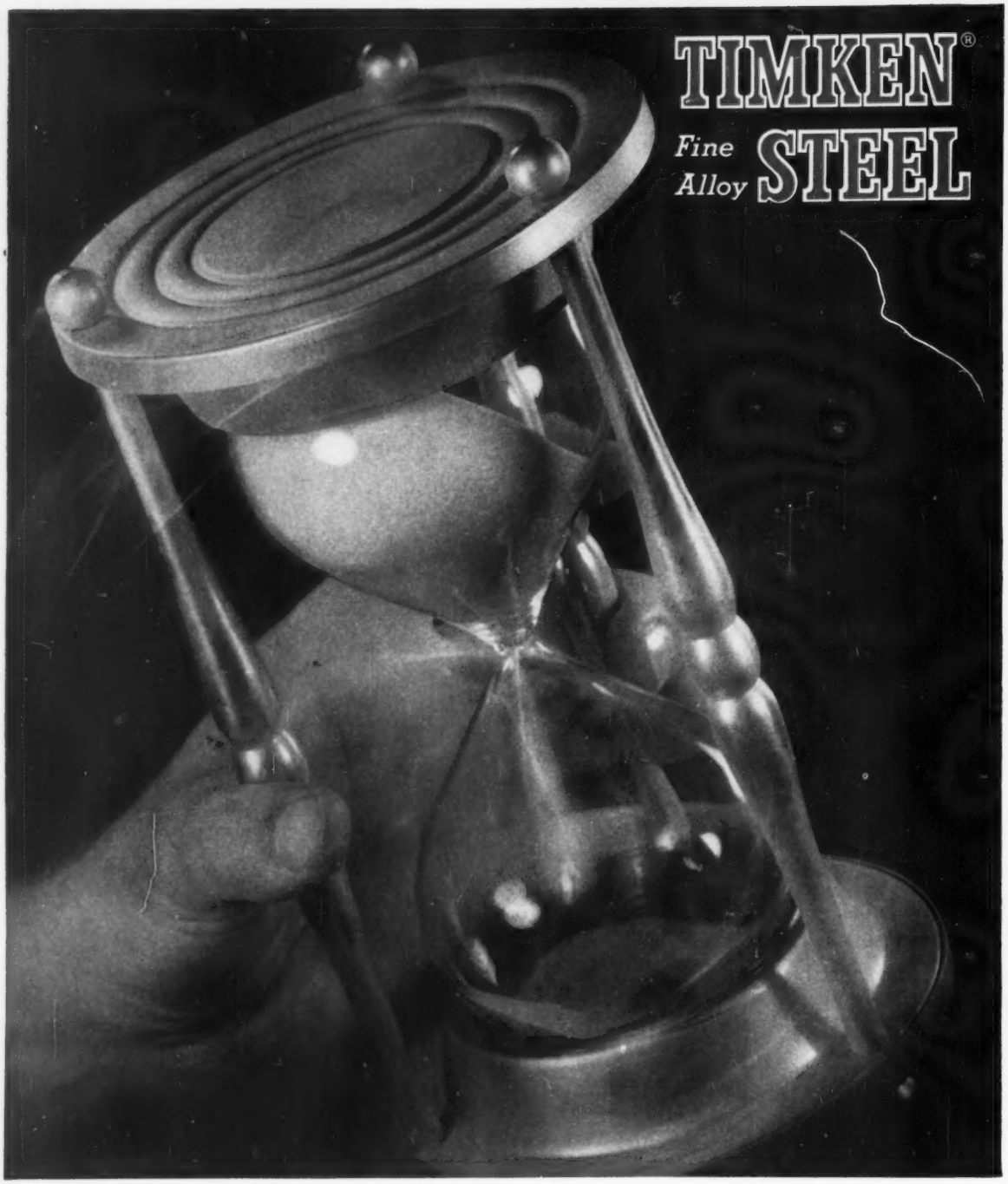

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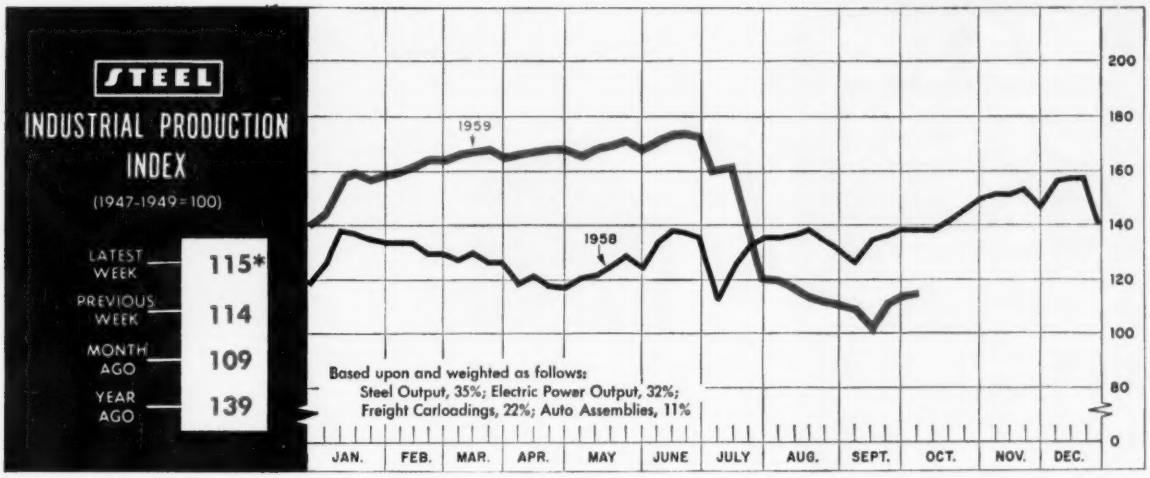

*Week ended Oct. 3.

Forecasters See Records for 1960

THIS COUNTRY'S economy will climb to an all-time high next year.

That's what you'll be hearing more and more in the next three months as the open season for forecasting gets underway. But don't be surprised by the caution in those predictions. A peak usually precedes a valley.

From the earliest economic forecasts, it looks like the general economy could easily follow the 1957 pattern. Even though the over-all indicators began to weaken in the final quarter of that year, the strength of the first three periods was enough to establish an annual record. There is no argument about the uptrend through the first half of '60. Also, there is considerable agreement that the trend will continue through the summer quarter although it will follow seasonal patterns induced by hot weather and vacations. But for the fourth quarter, it's a "pay your money, take your choice" proposition, depending to a large degree on the seriousness of the aftereffects of the steel, copper, and transportation tieups.

• **Here's the Picture** — Following the spending approach, James N. Land, senior vice president of Pittsburgh's Mellon National Bank & Trust Co., sees 1960 shaping up this way:

Defense spending will continue to be one of the sustaining factors, but it won't produce any particular uplift to the economy—unless there is a change in international affairs.

Private capital expenditures (including durable equipment and nonresidential construction) will continue to rise throughout 1960, probably exceeding the previous peak of $48.3 billion (annual rate) in 1957's third quarter. But he points out that this is no guarantee the total trend will still be up a year from now because capital spending usually lags the economy.

Residential construction probably is at the top of its cycle now. Mr.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	368[1]	365	1,933
Electric Power Distributed (million kw-hr)	12,900[1]	12,878	12,111
Bituminous Coal Output (1,000 tons)	7,695[1]	7,780	9,006
Crude Oil Production (daily avg—1,000 bbl)	6,850[1]	6,858	7,014
Construction Volume (*ENR*—millions)	$408.4	$410.7	$495.7
Auto, Truck Output, U. S., Canada (*Ward's*)	130,821[1]	119,137	53,567
TRADE			
Freight Carloadings (1,000 Cars)	575[1]	587	677
Business Failures (Dun & Bradstreet)	282	264	268
Currency in Circulation (millions)[3]	$31,809	$31,984	$31,215
Dept. Store Sales (changes from year ago)[3]	+7%	+16%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,144	$26,426	$21,952
Federal Gross Debt (billions)	$288.7	$288.7	$276 7
Bond Volume, NYSE (millions)	$31.4	$44.6	$29.8
Stocks Sales, NYSE (thousands of shares)	13,639	16,011	19,228
Loans and Investments (billions)[4]	$104.6	$105.6	$93.4
U. S. Govt. Obligations Held (billions)[4]	$28.4	$28.9	$31.5
PRICES			
STEEL's Finished Steel Price Index[5]	247 82	247.82	246.65
STEEL's Nonferrous Metal Price Index[6]	225.5	225.2	202.6
All Commodities[7]	119.2	119.6	118.8
Commodities Other than Farm & Foods[7]	128.3	128.3	126.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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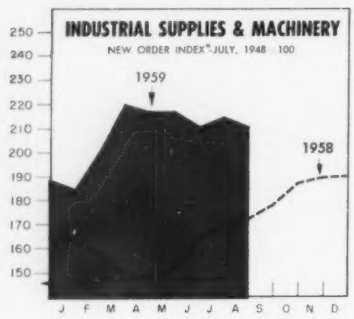
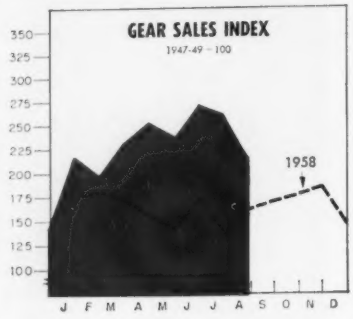
THE BUSINESS TREND





	1959	1958	1957	1956
Jan.	186	163	221	190
Feb.	202	157	219	190
Mar.	221	149	210	190
Apr.	218	148	203	195
May	218	152	199	199
June	212	164	199	197
July	216	170	197	203
Aug.	212	172	197	211
Sept.	...	178	203	203
Oct.	...	187	192	206
Nov.	...	189	180	220
Dec.	...	190	167	218

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.
Charts copyright, 1959, STEEL.

	1959	1958	1957	1956
Jan.	218.6	174.5	259.3	245.5
Feb.	199.9	179.1	239.5	256.2
Mar.	234.3	173.7	262.4	276.5
Apr.	255.6	153.2	221.7	264.7
May	241.0	142.2	263.2	275.6
June	274.2	173.8	215.9	245.4
July	262.8	133.3	211.4	286.7
Aug.	213.3	162.1	225.8	219.5
Sept.	....	170.7	174.9	230.5
Oct.	....	175.9	207.0	299.8
Nov.	....	182.7	165.3	216.2
Dec.	....	145.5	150.8	235.7
Avg	....	163.9	216.4	254.4

American Gear Mfrs. Assn.

Land sees a downturn at least by 1960, if not before the end of this year. This trend usually precedes the turn in the over-all economy.

Nondefense public construction—roads, schools, sewers, and the like—will exert an upward pressure for the next year or two, regardless of business conditions.

Automobile sales will rise above the expected 5,750,000 figure for this year, but they will not challenge the record of 7.2 million set in 1955. But Mr. Land questions whether sales of other consumer durable goods—appliances and furniture—will vary much from the current high level. If there is any increase, it will be small.

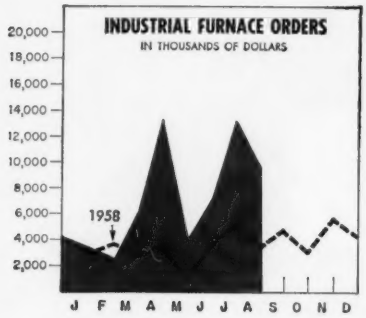
• **Big Question**—The above considerations would add up to nearly a standoff for 1960 were it not for inventory buildup. He feels once the steel strike is settled, accumulation will once again be at a high level, but the duration of the trend is the big question. Historical patterns show it could be anywhere from three to five quarters after the settlement. The other factors probably cannot keep the economy on an uptrend after inventory building stops.

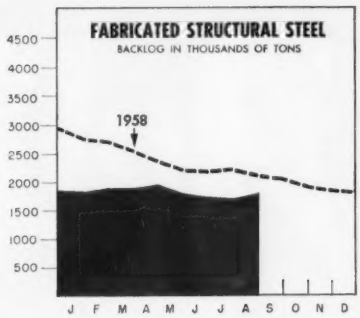
Mr. Land further notes that the mean for the duration of recovery and expansion in the last 19 business cycles is 24 months, but that the three uptrends since World War II have run closer to three years. But he is unwilling to go on record as favoring the three year period for the current cycle because conditions have changed materially in the last 10 to 15 years.

• **Calls the Turn**—Adding it all up, Mr. Land feels that expansion will turn to contraction somewhere between mid-1960 and mid-1961, but the "total volume of business done in the year as a whole will almost certainly be greater than the total volume of business done in 1959."

Different Tack, Same Outcome

Taking the money availability approach, L. D. Colburn, president of the Economic Forecasting Institute, Mt. Vernon, N. Y., comes up with about the same pattern for next year. He feels that credit is building up to the limit. While there will probably be a 5 per cent expansion in the next year, it will be only about half the increase ex-





	1959	1958	1957
Jan.	3,518	3,047	8,775
Feb.	2,741	3,684	9,769
Mar.	6,146	2,871	10,485
Apr.	13,328	3,572	4,559
May	4,174	954	5,389
June	7,029	3,672	4,369
July	13,141	5,169	4,332
Aug.	9,738	3,533	3,924
Sept.	....	4,846	7,463
Oct.	....	3,105	3,674
Nov.	....	5,597	2,832
Dec.	....	4,284	3,992

Industrial Heating Equipment Assn. Inc.

	Shipments 1959	Shipments 1958	Backlogs 1959	Backlogs 1958
Jan.	224.3	316.7	1,794	2,778
Feb.	216.1	282.6	1,864	2,727
Mar.	260.5	336.6	1,873	2,542
Apr.	290.6	323.6	1,922	2,387
May	294.1	328.2	1,768	2,211
June	365.4	329.2	1,717	2,191
July	238.6	290.8	1,679	2,220
Aug.	220.4	298.0	1,772	2,119
Sept.	....	313.7	....	2,047
Oct.	....	307.1	....	1,913
Nov.	....	271.1	....	1,839
Dec.	....	266.6	....	1,809
Total	....	3,664.2		

American Institute of Steel Construction.

perienced in the early stages of the recovery. Unless the government loosens its money policy before February, he says, demand for capital goods will decline in the last half. However, he feels that there will be some monetary action in the first quarter because of the pressures of an election year. But under the present conditions, he sees an uptrend in the first half, with a downtrend in the second half.

Orders, Output Still Up

Most businessmen in the Cleveland area still find business to their liking, although more and more are feeling the impact of the steel strike. In the latest report of the Purchasing Agents Association of Cleveland, the buyers report increases both in production and new orders. Employment outlook in this diversified industrial area also is good, with 95 per cent of the reporting members expecting to increase personnel or hold to month-ago levels.

Industry Reports Mixed

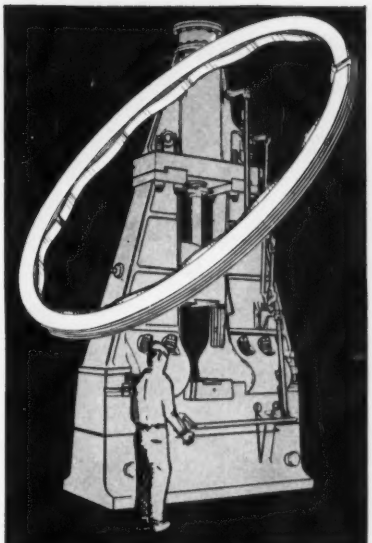
Industry reports for August showed a mixed pattern, with a slight balance on the down side. However, there is no cause for panic because most of the decreases, which were slight, could be traced to either weather or the steel strike.

Bookings for heat treating totaled $3,111,300, just under the July figure of $3,259,700, reports the Metal Treating Institute. Billings to date are 34 per cent ahead of the year-ago pace.

At 212 (July, 1948 = 100), the new order index of the American Supply & Machinery Manufacturers' Association Inc. was down 4 points from July's reading but still far above the average of any year in the association's history. (See graph and table, Page 80.)

New orders for all types of machine tools dipped to $52.4 million, down $11 million from the July total, reports the National Machine Tool Builders' Association. The August figure equals the monthly average for the first eight months of 1959. Shipments came to $40.4 million, virtually equal to the prior month's total.

Members of the Foundry Equipment Manufacturers Association upped their net orders in August to 134.1 per cent of the 1947-49 average, compared with the year's low of 110.7 in July.



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But easy to prove:

Hammer Seal Rings in steam or air hammers have consistently lasted from 4 to 10 times as long as any other type ring.

Hammer Seal Rings are light-weight laminated rings with four high-tensile spring steel rails per groove. They are held firmly against the cylinder wall by an expander, even in worn cylinders.

The four 1/16" rails in each groove have rounded edges to prevent scuffing or scoring. Lightness of the rails (ounces instead of pounds) plus a film of oil between the rails positively prevents groove pounding.

Hammer Seal rings are manufactured for cylinders 6" to 48" in diameter. They have given continuous service for as long as 4 to 5 years in some of the nation's leading forge shops without breakage or maintenance, due to their unique design and high quality material.

Hard to believe? We can prove it to you. Write for details.

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Ohio Rolls

shaping metal for all Industry

The Ohio Steel Foundry Co.

LIMA, OHIO ... *Virtually at the center of the steel industry*

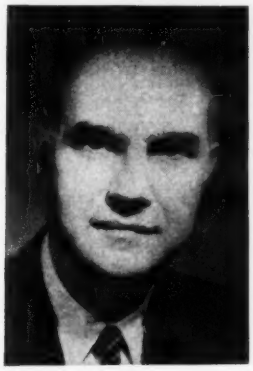
PLANTS AT LIMA AND SPRINGFIELD, OHIO

OHIO IRON AND STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

LEO A. MILEWSKI
Landers, Frary & Clark v. p.

LOUIS POLK JR.
heads Sheffield automation



RICHARD T. BRANCH
Crosley quality dir.

R. E. EGGERT
Cal-Dak v. p.

Leo A. Milewski was elected to the new post of vice president for product quality control and service at **Landers, Frary & Clark,** New Britain, Conn. He was manufacturing manager, New Britain operations.

Louis Polk Jr. was named assistant vice president and manager of **Sheffield Corp.'s** gaging and automation systems, including service and repair depots in major industrial areas. He was manager-Measuray Section at Sheffield, Dayton, Ohio, subsidiary of Bendix Aviation Corp.

Crane Co., Chicago, promoted **Walter W. Kovalick** to director of manufacturing. He was general manager, Chicago Works.

Shur-Lok Corp., Anaheim, Calif., named **Jack M. Cherne** assistant to the president. He was engineering director at Vard Inc.

Marshall Schober, assistant to the vice president-sales, **Latrobe Steel Co.,** Latrobe, Pa., was named manager of marketing.

A. Raymond Beard was named factory manager, **Norwalk Thermostat Co.,** Norwalk, Ohio.

O. J. Maha was appointed president and general manager, **Hannifin Co.,** a division of Parker-Hannifin Corp., Cleveland. Formerly a Hannifin vice president, he succeeds **Ellwood G. Peterson,** who continues as a vice president of the parent firm, specializing in corporate development.

Richard T. Branch fills the new post of director of quality and reliability assurance, **Crosley Div.,** Avco Corp., Cincinnati. He has been associated with Crosley's Richmond, Ind., plant in a similar capacity for the last 18 years.

Wendell P. McKown was made general manager, Centrifugally Cast Products Div., Dover, Ohio, **Shenango Furnace Co.** He replaces **H. S. Ream Jr.,** acting manager for the last year. Mr. McKown previously was general manager of Kelsey-Hayes Co.'s New Jersey Div., Clark, N. J. He also has served as vice president-manufacturing, Cooper Alloy Co.

Sheldon Kaplan was appointed vice president, **M. S. Kaplan Co.,** Chicago.

John J. Serrell was made vice president-sales, **Sharples Corp.,** Philadelphia.

R. E. Axthelm was named supervisor of application engineering, Electric Motor Div., **A. O. Smith Corp.,** Tipp City, Ohio.

Walter S. Rose was named sales promotion manager, **Baird Machine Co.,** Stratford, Conn.

Walter G. Moring Jr. was made manager of development engineering by **Toledo Scale Corp.,** Toledo, Ohio.

Argo G. Pison was appointed manager - quality control, **Bridgeport Thermostat Div.,** Robertshaw-Fulton Controls Co., Bridgeport, Conn.

R. E. Eggert, manager, Colton, Calif., plant, **Cal-Dak Co.,** was named vice president in charge of the company's metal factory operations. The Colton plant becomes headquarters for the Metal Mfg. Div. and engineering activities, with Mr. Eggert supervising metal manufacturing at other plants (Lancaster, Pa., Chicago, and Little Rock, Ark.). Other executives at the Colton headquarters plant will be **H. G. Francis,** chief manufacturing engineer; **W. C. Thompson,** chief industrial engineer; and **M. J. Rife,** production manager-Colton factory.

Walther C. Fischer was appointed director of engineering, **Fairbanks, Morse & Co.,** Chicago. He was engineering manager, Beloit, Wis., Works. He succeeds **Gordon R. Anderson,** named vice president-general manager, Beloit Div.

James C. Tourek was appointed vice president-engineering, **Vitro Engineering Co.,** New York, a division of Vitro Corp. of America. He succeeds **Sidney M. Stoller,** now a consultant for the division.

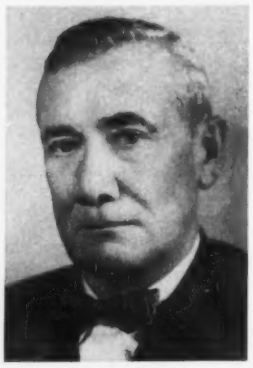
Adrian Marmor was made president and general manager, **Bilgram Gear & Machine Works,** Philadelphia. He was with Hale Fire Pump Co. Mr. Marmor succeeds **John Maywhort,** retired.

William T. McLaughlin was made field sales manager, Protective Coatings Div., **Pittsburgh Coke & Chemical Co.,** Pittsburgh.

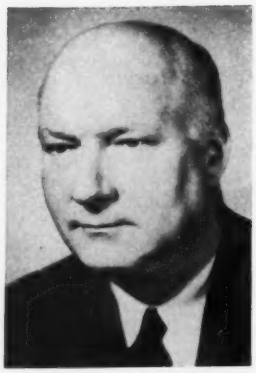
R. J. Bartholomy was made assistant superintendent, Campbell Open

HAROLD D. NORTH JR.
Ferry Cap & Set Screw pres.

THOMAS B. CHACE
Dole Valve exec. v. p.



O. D. RICE
Rust Furnace president



BRENNISS G. TYRRELL
Hanson-Whitney exec. v. p.

Hearth Dept., **Youngstown Sheet & Tube Co.**

Harold D. North Jr. was elected president, **Ferry Cap & Set Screw Co.**, Cleveland, succeeding **E. B. Lansing Jr.** who resigned last June. Mr. North was executive vice president, Engine Parts Mfg. Co., Cleveland.

Thomas B. Chace fills the new post of executive vice president, **Dole Valve Co.**, Morton Grove, Ill. **Frank H. Byrne** was made vice president-manufacturing. Mr. Chace was vice president-research and development. Mr. Byrne was manufacturing manager.

Weber deVore, former manager, Defense Products Div., Heintz Div., Kelsey Hayes Co., was named director of the new Advanced Materials Div. at **Taylor Fibre Co.**, Philadelphia, which was established primarily to meet the challenge for new lightweight, high strength materials for missiles and aircraft.

O. D. Rice was elected president of **Rust Furnace Co.**, Pittsburgh. He has served as vice president-general manager. **Frank A. Blaine**, former assistant general manager, succeeds Mr. Rice as general manager.

Chester E. Grigsby, vice president, **American Steel Foundries**, Chicago, and general manager of its Transportation Equipment Div., was named head of the division to succeed **Charles L. Heater**, retired.

Frank P. DeLuca Jr. was appointed executive vice president, **Acoustica Associates Inc.**, Plainview, N. Y. He was vice president-general manager of the Western Div., Los Angeles. **Fred C. Mehner**, formerly with Hughes Tool Co., was made general manager, Western Div.

Paul R. Totten was made works manager of the Cleveland Mill Div., **Chase Brass & Copper Co.** He succeeds the late **Howard C. Walters.** Mr. Totten was division superintendent, Allenport Works, Pittsburgh Steel Co.

Brenniss G. Tyrrell was elected executive vice president, **Hanson-Whitney Co.**, Hartford, Conn. **Oliver B. Ellsworth** was elected chairman. Mr. Tyrrell was executive vice president and treasurer of Whitney Chain Co.

William B. Stoddard Jr., former assistant manager, was promoted to manager - electrochemical development, **Hanson-Van Winkle-Munning Co.**, Matawan, N. J.

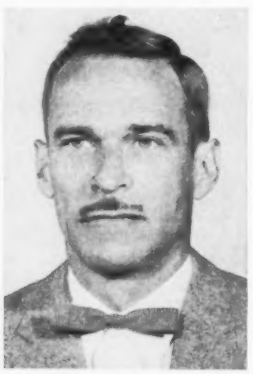
Loewy-Hydropress Div., New York, Baldwin-Lima-Hamilton Corp., appointed **William R. Liebel** assistant product sales manager-rolling mills; and **Felix Klein** assistant product sales manager-hydraulic machinery.

Ross Russell was named manager of industrial engineering at **Timken Roller Bearing Co.**, Canton, Ohio. He is succeeded as division industrial engineer, Steel & Tube Div., by **Tarzan Monda.**

Donald J. Lundstrom was made assistant to the sales manager, Con-

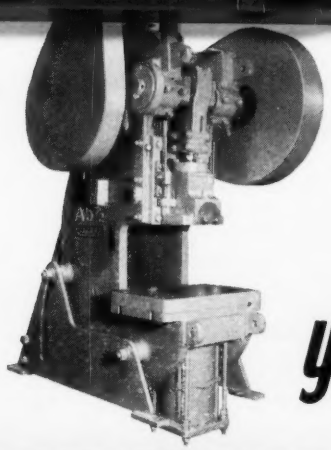
WEBER deVORE
heads Taylor Fibre div.

FRANK P. DeLUCA JR.
Acoustica exec. v. p.



PAUL R. TOTTEN
Chase Brass works mgr.

ROSS RUSSELL
Timken Roller Bearing post



for grass roots economy you just can't match this OBI

Cold, hard statistics leave no doubt. Wherever performance data and cost records are compared, the Series A Inclinable is way out front in parts produced per dollar expended.

On the most demanding jobs ... where the clutch is engaged and disengaged at every press stroke ... where three-shift operation continues day after day ... *no OBI can even approach it in thrifty operation, fool-proof simplicity, and safety.* Readily understandable are the reasons why:

Niagara's famed, multi-point mechanical sleeve clutch picks up the load on 14 engaging jaws, applying the driving force concentrically without keys or pins. Instant engagement and maximum productive strokes per minute are assured.

There are no complicated electrical circuits, relays, limit switches or solenoids . . . no palm buttons, air valves or rotary air connections. In fact no air is consumed.

With fewer parts and simpler construction, there's less to go wrong, less to repair or replace. As a result, this is not only a more economical press to operate, but a much safer press as well. Records of thousands of presses are factual proof that the Niagara mechanical sleeve clutch is unequaled in safety and reliability.

Built in 13 standard sizes, with shaft diameters from 1¼" to 6½" and capacities from 5½ to 190 tons, Niagara Series A Presses can be readily equipped with numerous accessories for individual requirements.

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NIAGARA

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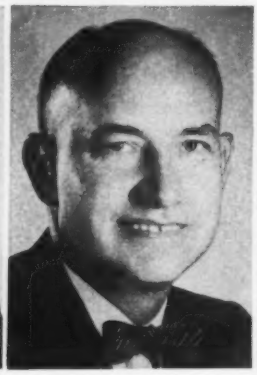
RALPH W. SMITH
Clippard Instrument Lab exec.

S. J. SIMMONS JR.
Alcoa Dev. Div. post

ROBERT B. SINGER
joins Minneapolis-Moline

JEROME V. BELL
Alloy Surfaces v. p.



JOSEPH H. CADIEUX
Casting Engineers president

ERNEST M. KRELL
joins Controls Co. of America

tainer Machinery Div., **E. W. Bliss Co.**, at Hastings, Mich.

Alloy Surfaces Co., Wilmington, Del., elected **Jerome V. Bell** vice president. He joined the firm in 1957 as chief engineer.

Joseph H. Cadieux was named president of **Casting Engineers**, a division of Consolidated Foundries & Mfg. Corp. in Chicago. For the last two years, he was vice president. He formerly was vice president-manufacturing, Misco Precision Casting Co.

Radio Corp. of America named **S. N. Lev** general manager of the Moorestown, N. J., Missile & Surface Radar Div. He was manager of the Airborne Systems Dept., Camden, N. J.

Ellis D. Verink Jr. was named manager, chemical and petroleum industry aluminum sales, **Aluminum Co. of America**, Pittsburgh. He was manager-Chemical Section of Alcoa's Sales Development Div., New Kensington, Pa.

Ernest M. Krell joined **Controls Co. of America** in the dual position of president, Controls Co. AG, Zug, Switzerland, and as manager-European operations. He was formerly with Giddings & Lewis Machine Tool Co.

Norge Div., Chicago, Borg-Warner Corp., appointed **Thomas J. McSweeney** manager of a newly formed Data Processing, Systems & Procedures Dept.

Maurice P. Rees was made Milwaukee district sales manager, **Youngstown Sheet & Tube Co.**, to succeed **J. J. McMahon**, retired.

W. D. Merkel was named Youngstown district sales manager, **Republic Steel Corp.** His headquarters are at the Warren, Ohio, plant. He succeeds the late **C. G. Medley.**

John A. Schroeder was made Ohio district sales manager, **Rochester Iron & Metal Co.**, Rochester, N. Y. He was district manager in Ohio for Fairmont Aluminum Co.

Ralph W. Smith was appointed executive vice president, **Clippard Instrument Laboratory**, Cincinnati, in charge of manufacturing and marketing. He has been with Coil Craft Inc. for the last six years.

S. J. Simmons Jr. was appointed general manager, Development Div., **Aluminum Co. of America**, Pittsburgh, which includes the Cleveland and New Kensington, Pa., branches. He was Philadelphia district sales manager.

Robert B. Singer, research and development engineer, Dana Corp., Toledo, Ohio, was named manager, Experimental Dept. Engineering Div., **Minneapolis-Moline Co.**, Hopkins, Minn.

W. H. Knowles was made sales manager, Defense Div., **Budd Co.**, Philadelphia.

Emory F. Webb was made an assistant sales manager, Tin Mill Products Div., **Weirton Steel Co.**, Weirton, W. Va., a division of National Steel Corp.

Joseph C. Selby was named manager of quality control-domestic and international for **Timken Roller Bearing Co.**, Canton, Ohio. He is succeeded by **Robert W. Dorn** as chief inspector, Canton and Gambrinus, Ohio, factories.

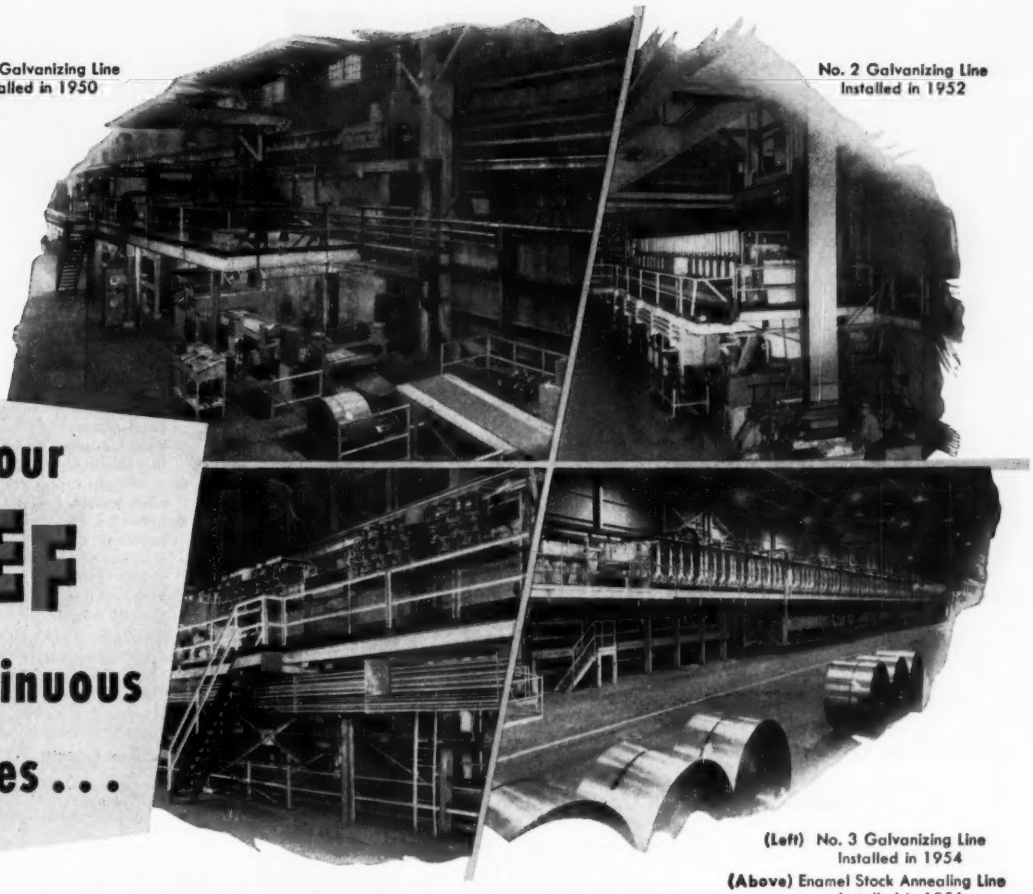
Thomas B. Rhines was promoted to assistant engineering manager; **Donald G. Richards** to chief engineer, **Hamilton Standard Div.**, United Aircraft Corp., Windsor Locks, Conn. **Stanley G. Best** succeeds Mr. Richards as chief of technical staff. **C. Deane McCarthy** was made chief development engineer, **Louis A. Urban** senior project engineer.

OBITUARIES...

Charles G. Purnell, 66, director-market research, **Jessop Steel Co.**, Washington, Pa., died Oct. 1.

Sumner H. Slichter, 67, **Harvard University** economist, died Sept. 27.

W. Ewart Bannerman, 58, president and general manager, **Page-Hersey Tubes Ltd.**, Toronto, Ont., died Sept. 16. He also was president of **Welland Tubes Ltd.**



No. 1 Galvanizing Line
Installed in 1950

No. 2 Galvanizing Line
Installed in 1952

(Left) No. 3 Galvanizing Line
Installed in 1954

(Above) Enamel Stock Annealing Line
Installed in 1956

Four EF Continuous Lines . . . at INLAND STEEL

provide efficient 24 hours a day, 7 days a week operation at high efficiency, with no unscheduled downtime.

TOTAL DESIGN CAPACITY IN EXCESS OF 617,000 TONS PER YEAR*

Repeat orders are the highest endorsement a furnace builder can earn. Tailored to meet Inland's specific requirements, and incorporating the most advanced technological improvements, these four EF continuous lines assure accurately controlled cycling, maximum production and maximum return per dollar invested.

The unvarying day after day uniformity of product physicals, assure highest market acceptance, and make subsequent forming and fabricating operations more efficient and less costly.

For up to the minute engineering, outstanding performance, and greatest return on your investment, on any continuous — or batch — ferrous or non-ferrous heat treating project, you'll find, like Inland, that "it pays to call the EF furnace engineers".

*Tonnage output will vary depending upon width and gauge of strip being processed.

EF

THE ELECTRIC FURNACE CO.

Gas-fired, Oil-fired and Electric Furnaces for Heat Treating any Product, Using any Process, any Hourly Output.

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Spring Steel

FOR ACCURATE FLATNESS, STRAIGHTNESS, WIDTH, GAUGE AND EDGE FINISH *PLUS* SPECIFIC PHYSICAL PROPERTIES

SS-138

When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

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Sandvik supplies cold rolled specialty strip steels –

- **In special analyses for specific applications.**
- **Precision-rolled thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered — scaleless or polished bright, yellow or blue.**
- **With square, round or dressed edges.**

Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

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Inland Steel Joins Group Developing Wabush Iron Ore

INLAND STEEL CO., Chicago, has joined the group of U. S. and Canadian iron mining and steelmaking companies which is developing a large body of iron ore in the Wabush Lake area of Labrador (STEEL, Feb. 23, p. 111). The company holds a 10 per cent interest in Wabush Iron Co. Ltd. which has a long term lease on a 5-square-mile tract under a concession for the development of mineral and timber resources.

The ore property lies near the western border of Labrador, 200 miles north of Seven Islands (the St. Lawrence River loading port), and 37 miles from the Quebec, North Shore & Labrador Railway. Canadian government estimates have placed the potential of the ore body at 1 billion tons. The low grade ore will be concentrated.

• **Ante $200 Million** — Plans call for an ultimate capacity of 10 million tons a year. Development of the property (including a processing plant, town site, railroads, and shipping facilities at Seven Islands) might require an investment exceeding $200 million.

Next year, a pilot plant will begin shipments for large scale tests of the ore concentrates in steel plants. The 37 mile railroad connection (Wabush Lake Railway Co.) to the Quebec, North Shore line will be completed by then.

Construction of permanent facilities is expected to begin in 1961. Shipments are expected to start by 1965.

Initial annual production: 4 million to 5 million tons.

Other owners of Wabush Iron Co. are Youngstown Sheet & Tube Co., Youngstown; Steel Co. of Canada Ltd., Hamilton, Ont.; Interlake Iron Corp., Cleveland; and Pickands Mather & Co., Cleveland, manager of the Wabush properties.

• **Inland's Other Sources** — The venture marks Inland Steel's entry into iron ore in eastern Canada. A subsidiary, Caland Ore Co. Ltd., has an ore mine under development at Steep Rock Lake in western Ontario, but its own operations have been confined to the upper peninsula of Michigan and the Minnesota iron ranges.

Philip D. Block Jr., vice chairman, says Inland will continue to receive the major portion of its ore needs from the Lake Superior district. But he points out that the St. Lawrence Seaway enables a Chicago steel plant to receive ore from the East by low cost water transportation.

Of the vast deposits of iron ore discovered in Labrador in the last decade, he considers Wabush to have one of the best. Although the Wabush ore is relatively low in iron content in its crude state, its structure is such that it can be concentrated readily into a product highly desirable for Inland's blast furnaces, Mr. Block adds.

Hubbard Doubles Capacity

Hubbard & Co., Chicago, producer of pole line hardware, has doubled the capacity of its Cicero, Ill., plant. An addition has been completed, and original sections of the plant have been modernized. New equipment includes a 300 ton blanking and forming press, a 200 ton blanking press, cut threaders, and bar shears. The new plant area includes facilities for blanking, shearing, upsetting, forging, trimming, pointing, cut threading, roll threading, and cold heading.

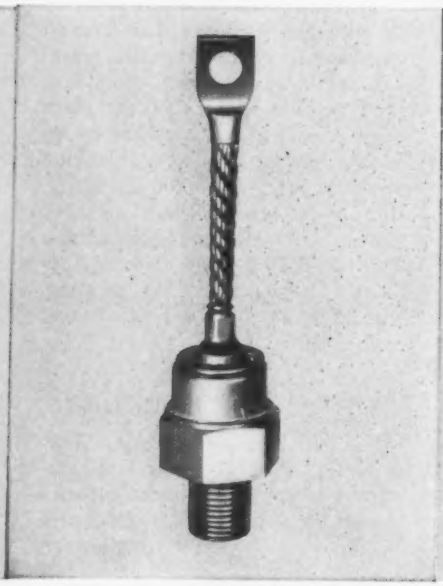
Expands Enameling Unit

Caloric Appliance Corp., Topton, Pa., plans to expand its porcelain enamel department capacity by 50 per cent. New facilities will include a 135 ft straight-through furnace; a "fallen ware" alarm system with a movable furnace floor; new application lines for dipping and spraying ground coat and lining, ground coat for cover white, and color or white cover coat; an enlarged curtain wall assembly and

(*Please turn to Page* 92)

new . . . Silicon Type WS

200, 300, 400 and 500 Amperes
230/460 Volts
60% Duty Cycle



Silicon diodes in the three-phase, full-wave rectifier are the heart of the WS welder. These diodes have a capacity far in excess of the rating for the welder and are hermetically sealed against dust, oil, water and acid fumes by a new bonding process. Each diode is thoroughly tested before and after insertion in the bridge.

Watch Westinghouse for New Developments in Welding

Rectifier Welder

- *Maximum Performance at Minimum Cost*
- *Highest Degree of Electrical Efficiency*
- *Most Compact Welder in the Industry*
- *Extremely Low Maintenance*

The Type *WS* silicon rectifier welder reflects engineering skill of the highest order. This welder is designed for maximum performance and reliability. It is a product of experience—developed in the Westinghouse laboratories and tested in the field under a variety of conditions. The welder you purchase will be checked out in every detail before it leaves our factory. Every conceivable precaution has been taken to assure you of a faultless piece of equipment.

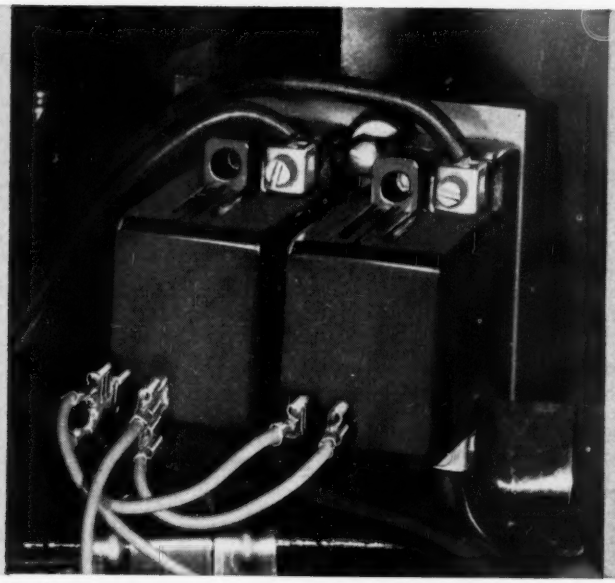
Westinghouse pioneered this completely new concept in industrial welding machines over 10 years ago. Since that time another refinement of the rectifier-type welder was achieved by Westinghouse through the use of silicon diodes. The ultimate in silicon rectifier machines is the Westinghouse Type *WS*.

No other welder on the market has the electrical circuitry to produce sound quality welds as consistently as the *WS*. It provides easier starting, arc stability and maximum drive. Silicon rectification means top welding performance.

The *WS* is the lightest, smallest machine on the market. It is easy to handle and is a space saver. Its bonderized steel casing, protected by baked-on enamel, gives it a weatherproof construction. The high-quality materials in this welder will render long life and trouble-free service.

Learn more about this reliable source of power for welding!

Contact your nearest franchised Westinghouse welding distributor—or write: Welding Division, Westinghouse Electric Corporation, 4454 Genesee Street, Buffalo 5, New York. J-22150



The inverse time relay shown here allows adequate time delay for arc starting at high current setting and freedom from nuisance power interruptions—yet it protects against serious short circuit faults. Capacitors divert and store peak, high-value, short-time voltage spikes that occur when electrical current is broken.

The Type WS has virtually no moving parts to wear out; thus, replacement is at a minimum. The easy access panel shown here makes routine maintenance and air cleaning of the rectifier bridge a fast, simple operation. Be cost-wise, avail yourself of this extremely low maintenance!

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WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV FRIDAYS

it's Jewel Bright

takes tough twists without

FLAKING, POWDERING, or PEELING

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A PATENTED GALVANIZING PROCESS

CHAIN QUALITY WIRE

The Zinc Coated Wire with the Plated Look

Brytite Wire is so shiny bright and satin smooth that electroplating and special finishing operations are not needed —a valuable saving in labor and materials! The coating is so tight that it withstands severe deformation of the base metal—takes hard turns and twists without flaking, powdering, or peeling.

In Many Sizes, Finishes, Tempers and Analyses

Specify BRYTITE in Satin Finish, Unwiped, or redrawn (in certain sizes)... in various tempers and analyses in low carbon and medium low carbon steels... for quality weldless or twisted wire chain, or wherever long-lasting brightness is desired. Special shapes, too.

Free Manual of Continental Manufacturers' Wire. Contains details of BRYTITE and other types of Continental Wire. Write for copy.

Fine Finishes in Manufacturers' Wire

CONTINENTAL STEEL

CORPORATION—KOKOMO, INDIANA

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, BRYTITE, Annealed, Liquor-Finished, Bright, and Special Shaped Wire. Also Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

(*Concluded from Page 89*)

laminating building; and new loading platforms to handle large panels.

Will Install Coating Unit

Aluminum Co. of Canada Ltd., Montreal, Que., plans to build a $600,000 painting facility at its sheet mill at Kingston, Ont. The installation will enable Alcan to coat aluminum sheets with enamel colors.

Gerrard Building Plant

A. J. Gerrard & Co., Melrose Park, Ill., is constructing a plant in Des Plaines, Ill. It will house equipment to manufacture flat and oval strapping, as well as tools and accessories.

Carborundum Integrates

Carborundum Co., Niagara Falls, N. Y., has launched a fully integrated program for the manufacture and sale of abrasive tumbling media, barrel finishing compounds, and tumbling machines and equipment. Nelson L. Watkins heads the program as product manager of barrel finishing and reports directly to D. N. Roger, manager of industrial sales.

Eastern Tool Expands

Eastern Tool & Stamping Co. Inc., Saugus, Mass., has started construction of a 40,000 sq ft plant. Austin Co., Cleveland, is the builder.

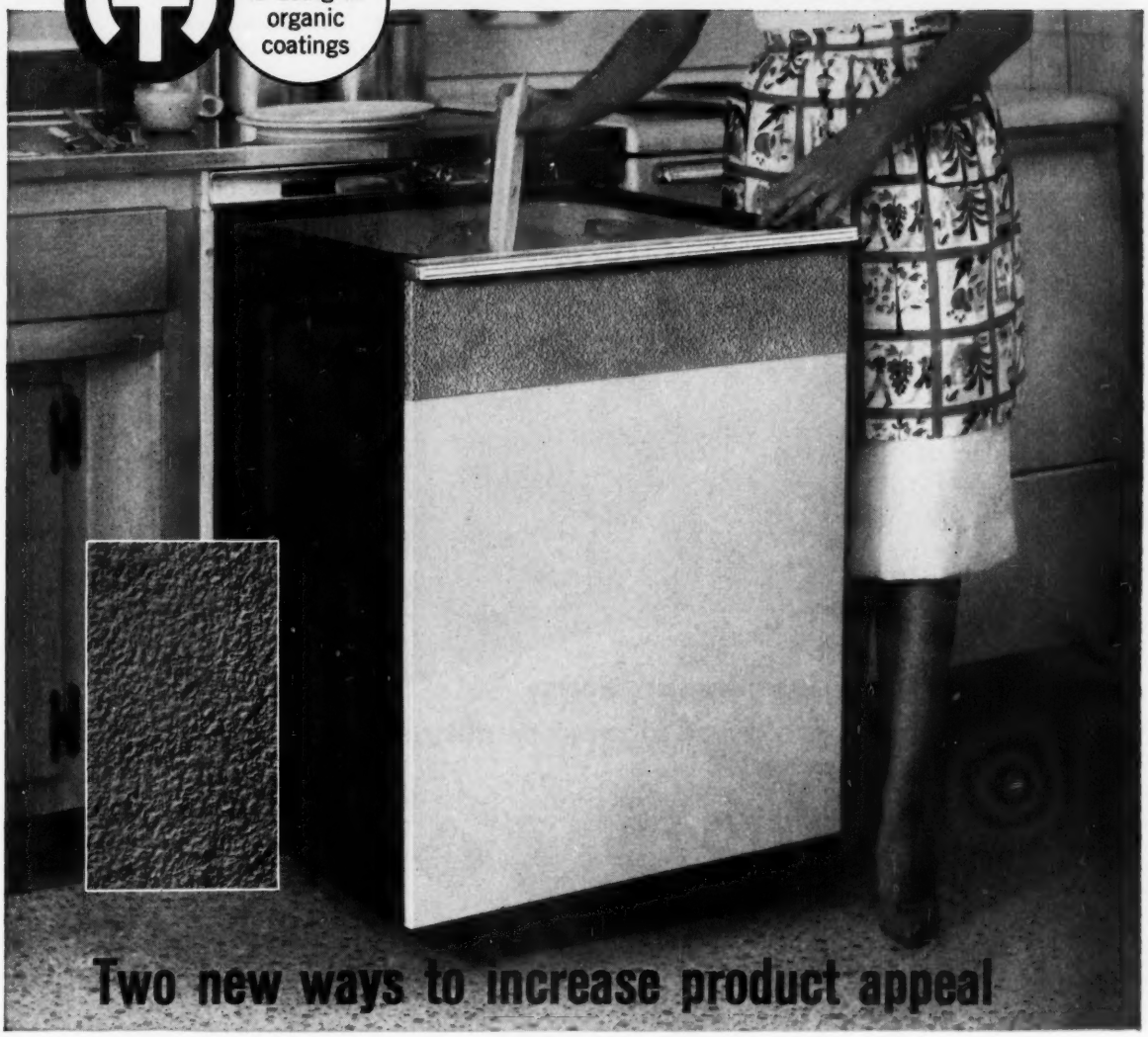
Bendix Aviation Builds

Bendix Aviation Corp., Detroit, is building a semiconductor products plant at Holmdel, N. J. The 72,000 sq ft plant will house manufacturing facilities, marketing offices, and engineering and research laboratories to handle the company's line of power transistors and silicon power rectifiers.

Stokes Enlarges Plant

F. J. Stokes Corp. has embarked on another major expansion of its production and engineering facilities. It has let contracts for a 50,000 sq ft addition to its present plant at 5500 Tabor Rd., Philadelphia. The new facilities will increase the company's manufacturing and as-

What M&T is doing in organic coatings



Two new ways to increase product appeal with richly textured M&T vinyl finishes

Adding the richness of a textured or patterned finish is a fast way to create a "deluxe" line without spending much extra money . . . if any. Two recent developments in M&T vinyl coatings make such appealing finishes particularly easy to adopt.

1. M&T Coating 6400 sprayed on smooth metal products gives a handsomely textured finish, with a warm, leather-like appearance.

2. M&T Coating 6440 sprayed on products fabricated from mill-patterned sheet metal faithfully mirrors even the most delicate metal pattern in thick as well as thin coatings.

Advantages? There are plenty. Sprayed vinyl coatings prove at least 10 times more wear resistant than baked textured enamel. And their inherent chemical resistance protects against stains and corrosion. Then there's the warmth to the eye and touch . . . the sound deadening qualities . . . the color possibilities. As for production, spraying the finished product eliminates expensive scrap loss; it also eliminates seam problems at all joints.

Ask the M&T Man about them . . . and about other quality M&T products to help you add more value to *your* products

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY

Job report courtesy of
Electric Steel Foundry Company, Portland, Oregon

When nuclear applications call for stainless welds of highest quality

WELD WITH ARCOS

STAINLESS ELECTRODES

This is part of a 3900 lb. stainless pump-volute casting for a submarine nuclear power plant. In the photo, a skirt is being welded to the casting using 5/32" dia. Arcos Chromend K Electrodes. To minimize stresses, a step-back and skip procedure was used. These welds conformed to Class I Navy radiographic standards—an indication of the dependability of standard Arcos electrodes for your stainless welding needs. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

sembly capacity by about 20 per cent and will considerably enlarge the amount of space available for product design, sales engineering, and technical service.

NEW ADDRESSES

Republic Industrial Corp. moved its headquarters to 520 Broad St., Newark, N. J. Through its five subsidiaries, Republic produces cranes, hoists, derricks, and other material handling equipment; barges, dump scows, ferry boats, and tugs; die forgings of ferrous and nonferrous metals; precision fasteners; and ferrous and nonferrous mechanical springs, clips, wire forms, and stampings.

Blaw-Knox Co., Pittsburgh, moved its heavy steel form sales offices for the eastern region to 230 Park Ave., New York, N. Y. W. P. Hedlund continues to represent this phase of the company's activities.

NEW PLANTS

Tubular Products Div., Babcock & Wilcox Co., is building a plant at Beaver Falls, Pa., for the production of welding fittings and flanges. The new plant will be integrated with the division's steel mills and tube mills at the new location and will replace operations for production of fittings and flanges at the plant in Milwaukee.

Burgess-Norton Mfg. Co. has purchased the industrial buildings and 24 acres of land at South Street and Western Avenue, Geneva, Ill. Headquarters and principal production operations will continue at the main plant at Peyton and Richards Streets, that city. The company's products include sintered metal parts, cold extruded metal parts, crushed tungsten carbide abrasives, and hydrogen-copper brazed assemblies.

Pennsylvania Flexible Metallic Tubing Co., Philadelphia, is erecting a plant two miles west of Paoli, Pa. It will produce ferrous and nonferrous metals, corrugated and interlocked flexible metallic tubing, expansion joints, automatic barrel

fillers, and pneumatic rivet passers. Improved testing and laboratory facilities and a new research and development unit will be included in the plant.

CONSOLIDATIONS

John F. Casey Co., Pittsburgh, acquired **Sommerfeld Machine Co.**, Braddock, Pa., and will operate the property as a subsidiary. The Sommerfeld machining facilities will be combined with the shop, fabrication, and machining facilities of Casey. Officers of Sommerfeld Machine Co. Inc. are: President, C. C. Carter; vice president-sales, R. F. Hackman; vice president-production and operations, C. Robert Liebel; secretary, H. G. Cranston; and treasurer, A. D. McCombs.

A. O. Smith Corp., Milwaukee, purchased the **Crowley Div.** of Aerovox Corp., West Orange, N. J., maker of ferrite components, permanent magnets, and powdered iron ores.

Allis-Chalmers Mfg. Co., Milwaukee, purchased the **Valley Iron Works Co.**, Appleton, Wis., subject to approval of Valley Iron stockholders. The Appleton firm makes papermaking machinery.

Pullman Inc., Wilmington, Del., acquired **Swindell-Dressler Corp.**, Pittsburgh, and will operate the property as a subsidiary. Swindell-Dressler designs, engineers, and constructs furnaces for the metal and ceramics industries. The company also maintains a Public Works Div. for designing highway, water supply, and sewage systems.

National Acme Co., Cleveland, purchased the **Shalco Corp.**, Palo Alto, Calif., maker of shell core and shell molding machines and related production foundry equipment. Manufacturing facilities for Shalco standard shell core machines are being set up in National Acme's Plant 2; development of new and special machines and auxiliary equipment will continue in Palo Alto for the time being. Herbert von Wolff is manager of the Shalco Div.; Ashley Hollingsworth, chief engi-

(*Please turn to Page* 98)

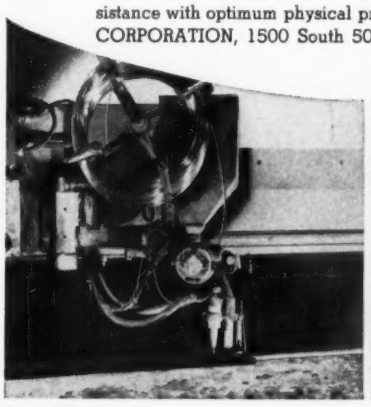
Job Report Courtesy of Alco Products, Inc., Schenectady, N. Y.

Nuclear pressure vessel stainless clad at low cost

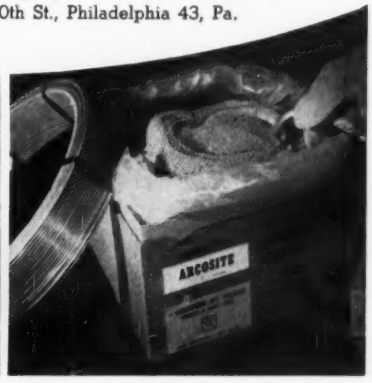
USE ARCOS

STAINLESS WIRE and BONDED FLUX

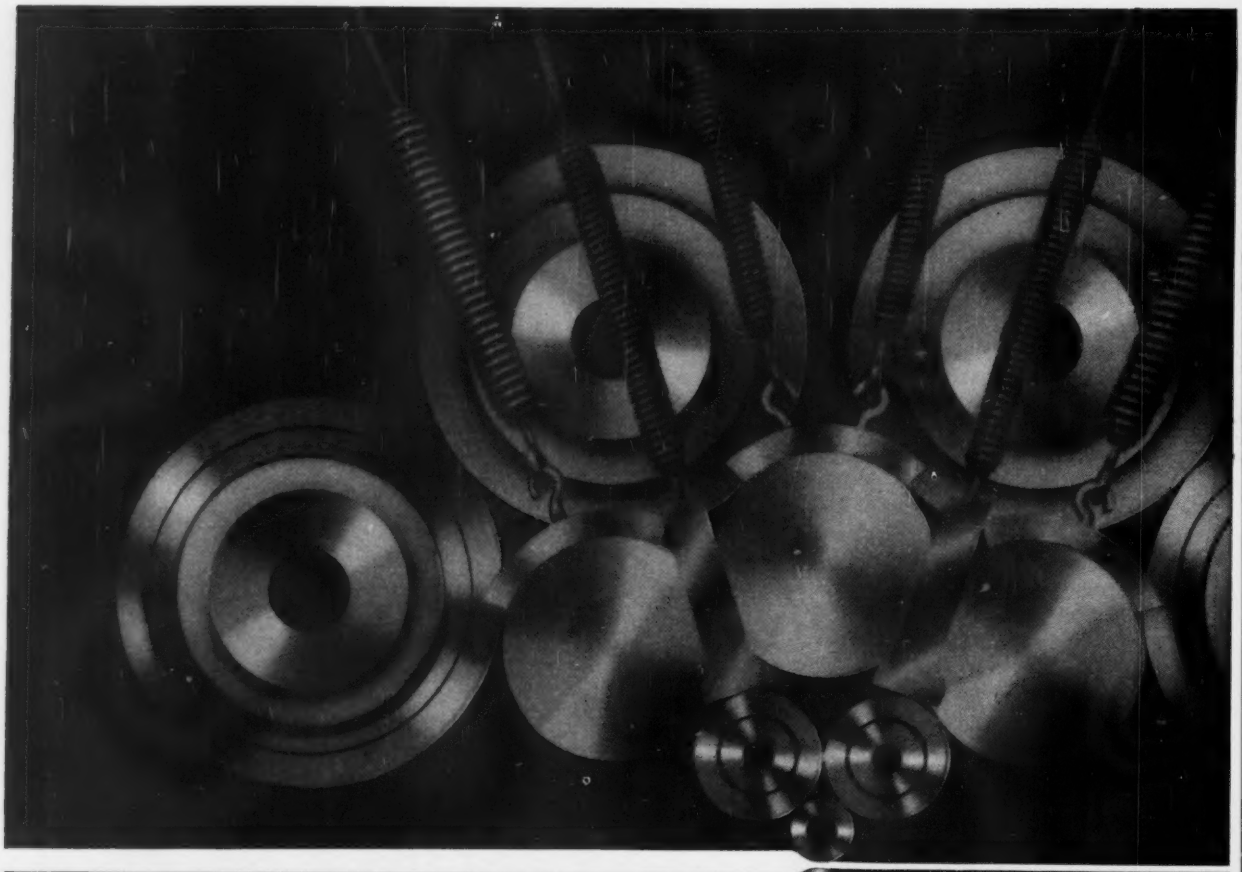
This "barrel" is one of several that comprise a nuclear pressurizer to operate under highly corrosive conditions. To reduce costs, Alco Products forged the shell of ASME A-336, 2—4 inch thick manganese molybdenum steel and clad the inside with stainless. The illustration shows the second pass overlay which was made by submerged arc using Arcos Chromenar K-LC (Type 308) bare wire and Arcosite S4 flux. Lower cost, and high corrosion resistance with optimum physical properties were obtained. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

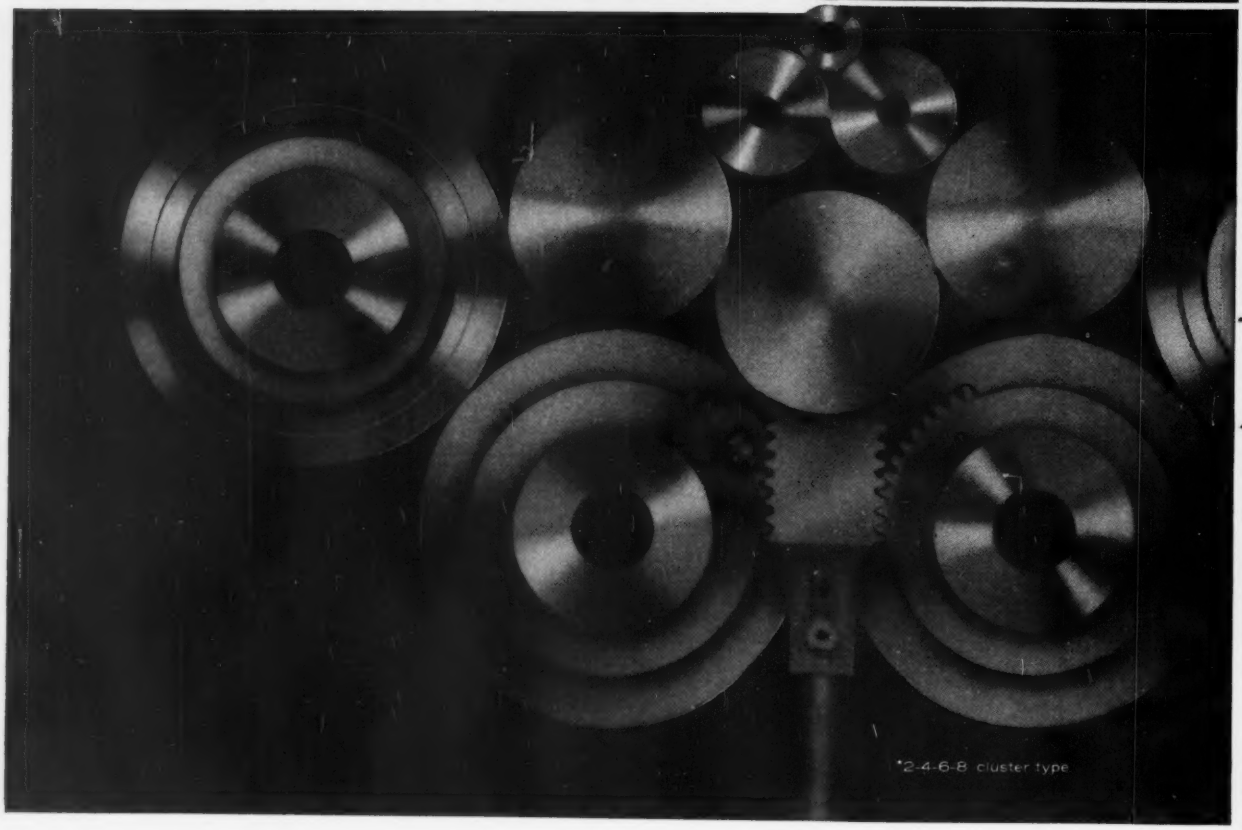


Bare Wire



Arcosite Flux





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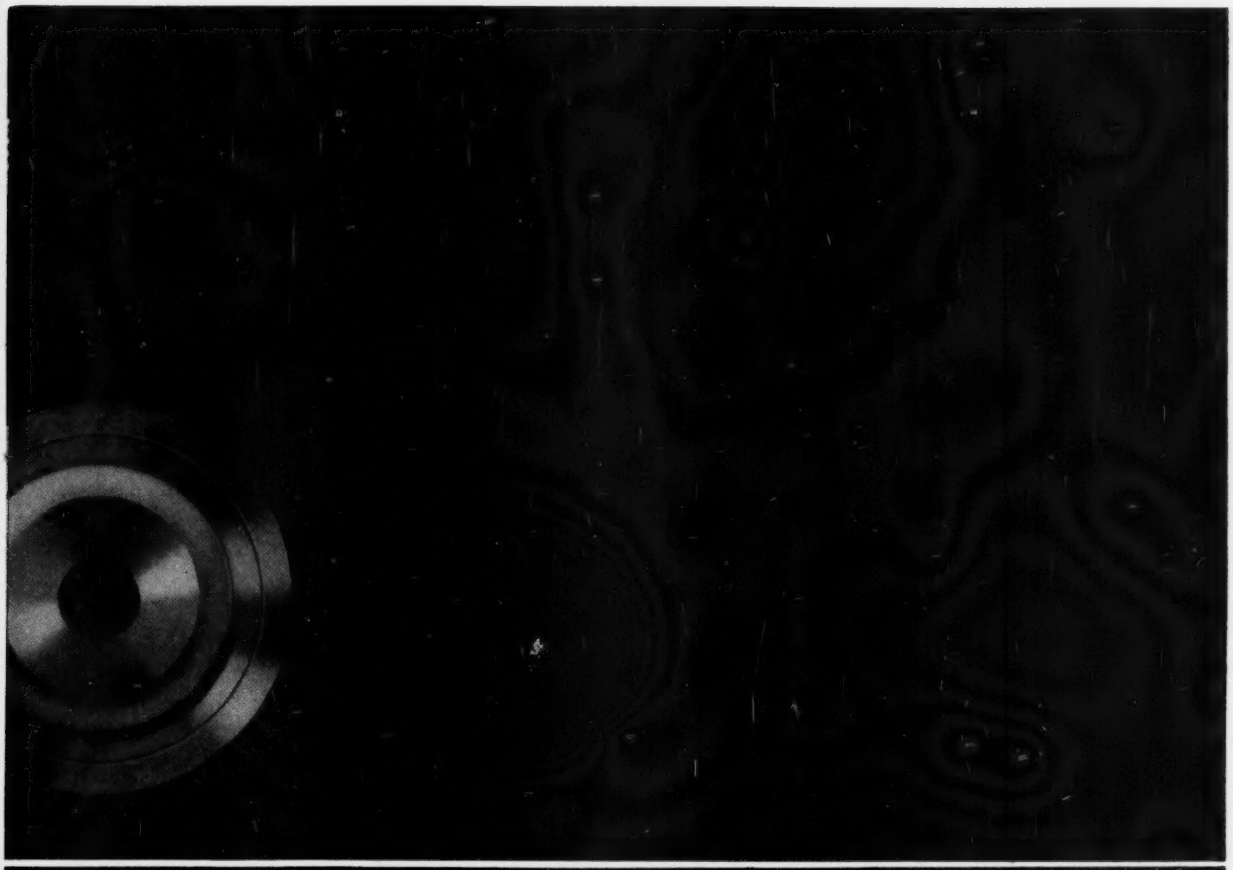


PINPOINTED POWER

In Eastern's celebrated "Z" mill,* photo-diagrammed here, two highly finished, small-diameter work rolls pinpoint the combined power of eighteen progressively larger back-up rolls and bearings . . . to produce light gauge stainless steel sheets, coils and strip. This Sendzimir method of precision cold rolling achieves the deepest "bite" per pass . . . close-tolerance gauges down to .007" . . . widths up to 48" . . . a surface of uniformly superior quality.

Two years of "Z" Mill experience add to the assurance that Sendzimir-produced Eastern stainless steel will meet your specifications . . . accurately and always.

EASTERN
STAINLESS STEEL
BALTIMORE 3, MARYLAND, U. S. A.

Specify PANNIER STEEL STAMPS for a longer life of CLEANCUT MARKING

29,335 hammer blows—and still marking cleanly—Pannier Letter and Number Stamps

Rounded corners for finger comfort
Rounded head distributes impact, reduces mushrooming.
Type size identification
Added metal in Pannier fillet increases durability. Correct bevel gives clearer impression, longer life. Outside bevel longer than inside for protection of character face.

Made of the finest tool steel and correctly heat treated for best combination of hardness and toughness, Pannier single character stamps can take it! Scientific shaping and accurate engraving insure a long life of good, clear impressions. Available in letters, figures and special symbols, and in light, medium or heavy duty design.

Extra tough steel forging stamps for hot or cold, heavy duty marking

For stamping names, part or patent numbers, trade marks and similar markings, Pannier forging stamps are made in four styles:—Hand-style, fullered for wire handle and wood handle style with eye parallel or perpendicular to lettering. All are designed and heat treated for clear impressions and long service. All are covered by the Pannier Master Marker guarantee.

Supreme Holders with "Roto-Pin" for quick, easy number change

An easy, half-turn flip for Roto-Pin releases any or all of the steel type for fast change. A reverse flip locks them in perfect alignment.

Roto-Pin makes this Pannier Master Marker a time saver in number change and makes serial number marking fast and efficient. The hardened anvil at the base of the type slot keeps type in perfect alignment for equal impression. Machined from bar tool stock, the Supreme Holder has a heat treated striking head. Both anvil and striking head are replaceable for longer life of the holder itself. Made in hand or wood handle styles, for hot or cold marking.

Write for literature

BIRTHMARKED MATERIALS

MARKING MASTER PANNIER MARKERS DEVICES

THE PANNIER CORPORATION

220 PANNIER BUILDING PITTSBURGH 12, PA.

Offices: Los Angeles • Cleveland • Chicago • Philadelphia • Birmingham

PANNIER MASTER MARKERS FOR QUALITY

(*Concluded from Page 95*)

neer; and Norman Swanson, works manager in California.

Crane Co., Chicago, acquired **Chapman Valve Mfg. Co.**, Indian Orchard, Mass., and will operate it as a division.

True-Trace Sales Corp. and **True-Trace Mfg. Corp.** have merged with **True-Trace Corp.**, El Monte, Calif. The corporation designs and manufactures hydraulic tracing controls and components for machine tool builders. The firm also adapts tracer controls to machines.

Houston Instrument Corp., **Crump Instrument Corp.**, **Houston Magnetic Products Inc.**, and **Instrument Mirror Mfg. Co.**, all of Houston, have merged. Officers of Houston Instrument Corp. include: President, E. V. Hardway Jr.; vice president, E. E. Crump, who is also general manager of the Magnetic Products Div. and Crump Instrument Div.

Subject to approval of stockholders, **Twin Coach Co.**, Buffalo, and **Hiller Aircraft Corp.**, Palo Alto, Calif., may merge. Officers of the combined operation would include W. H. Coleman as chairman and Stanley Hiller Jr. as president.

ASSOCIATIONS

Kenneth C. Allen has been appointed secretary of the committee on commercial research of **American Iron & Steel Institute**, New York. This is a new staff position. Mr. Allen has been supervisor of research and analysis in the commercial research division of Jones & Laughlin Steel Corp., Pittsburgh.

Manufacturers of steel underfloor raceway systems have joined the **National Electrical Manufacturers Association**, New York, through affiliation with NEMA's newly organized Steel Underfloor Raceway Section.

American Society of Civil Engineers, New York, elected these officers: President, Frank A. Marston, Boston; and vice presidents, C. B. Molineaux, New York and L. A. Elsener, San Francisco.

When Bell & Howell switched to Nialk Trichlorethylene with **psp**—permanent staying power, it extended clean-outs to a full three months.

How Bell & Howell degreases 390,000 lbs. of metal parts between bath clean-outs

When Bell & Howell switched to a Nialk® Trichlorethylene bath recently, it was found that bath clean-outs could be extended to a full three months.

Previously the bath had to be cleaned *every ten days.*

With the new Nialk bath, Bell & Howell is degreasing 195 tons of small camera and projector parts between clean-outs. The parts are aluminum, brass, steel and zinc and can all be cleaned in the same bath.

The secret is in the stabilizer

The only thing different about the Bell & Howell bath is the Nialk stabilizer. Light, heat, air and acids have no effect on the bath. Even aluminum fines, which can sour trichlor fast, have no effect in the presence of the Nialk stabilizer.

This stabilizer is not extracted by water either; hence all of it is reclaimed during distillation and steam injection. So permanent is the stabilizer that the bath stays fresh and fully protected at all times.

Bell & Howell simply adds more trichlor as drag-out losses lower the bath level; they never have to replenish the stabilizer itself.

FREE BULLETIN • The whole question of stabilizers is so important to anyone concerned with vapor degreasing, we've written a bulletin specifically on the Nialk stabilizer and its advantages. Write for Bulletin 70 if you'd like a copy.

HOOKER CHEMICAL CORPORATION
1210 Union Street, Niagara Falls, N. Y.

HOOKER CHEMICALS PLASTICS

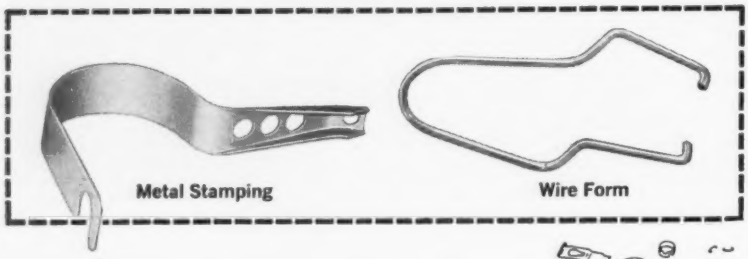
NIALK® CHEMICALS
OLDBURY® CHEMICALS
DUREZ® PLASTICS

Sales Offices: Chicago, Ill.; Detroit, Mich.; Los Angeles, Calif.; New York, N. Y.; Niagara Falls, N. Y.; Philadelphia, Pa.; Tacoma, Wash.; Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B. C.

4 reasons why

Nilson Automatic 4-Slides are "Universal" Forming Machines

1. **Form Wire or Ribbon Metal Stock**
2. **Accommodate Long or Short Pieces**
3. **Job Versatility through Quick-Change Cams**
4. **Combine Stamping & Forming in 1 Machine**



Every Nilson Automatic 4-Slide is truly a "universal" forming machine, a machine designed to produce either wire forms or metal stampings at high production rates.

Open construction provides easy access to all tooling . . . permits rapid changeover from one stock to the other. And longer feeds, longer slide strokes give a Nilson the built-in ability to handle a wide range of work sizes — without special attachments or accessories.

For real efficiency in your pressroom, just pick the capacity you need from Nilson's 17 models of 4-slides! One of these versatile machines will make your stamping and forming operations faster, easier . . . and more profitable.

SIZE RANGES:
Wire up to ½" diameter
Ribbon stock to 3½" wide
Feeds up to 32"

5 TO 75 TON
PRESS SECTIONS

Write today for the Nilson General Catalog on Automatic 4-Slide Equipment

NILSON
THE A. H. NILSON MACHINE CO.
605 Bridgeport Avenue • Shelton, Conn.

AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

Coming Nov. 16

The Manager of the Future

What will he be like? What problems will he have to solve? What will be his responsibilities?

STEEL's next and last article in the 1959 Program for Management will answer those and many other questions.

A hint of the scope of the future can be found in these estimates for 1975: We'll need 250 million tons of steel (vs. output of about 95 million tons this year). We'll have 235 million people (vs. today's population of 177 million). Metalworking sales should reach $372 billion (vs. $140 billion this year).

Articles in the series published to date:

1. **Profile of Metalworking's Managers (Feb. 16, p. 137).**
2. **Improving Productivity (Mar. 16, p. 103).**
3. **Keeping Wages in Line (Apr. 13, p. 95).**
4. **Giving More Public Service (May 18, p. 99).**
5. **Meeting Foreign Competition (June 15, p. 131).**
6. **Keeping Pace with Technology (July 13, p. 95).**
7. **Increasing Research, Development (Aug. 17, p. 87).**
8. **Improving Marketing (Sept. 14, p. 153).**
9. **Management in Transition (Oct. 12, p. 101).**

An extra copy of these Program for Management articles is available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

THE CHANGING ROLE OF METALWORKING MANAGERS

Management in Transition

"SOMETIMES I WISH we had stayed in our own backyard, content with the $12 million volume and 14 per cent income after taxes we had 12 years ago," comments a Milwaukee company president.

"Our managers were more efficient then. We didn't need so many of them around. And the management applecart wasn't being upset continually with line-staff squabbles."

The executive readily admits to a degree of exaggeration, adding: "Neither an individual nor a company stands still long—you're either growing and moving ahead, or you're slipping." His firm's volume this year will top $51 million.

What he is really reflecting are the problems of today's management . . . a management in transition . . . a management that is striving to keep pace with an economy double what it was 12 years ago and trying to prepare for the next surge at the same time.

Our galloping technology in the postwar years brought more than growth; it made the operation of a business enterprise more complex than ever before. Metalworking has done a relatively good job in keeping pace with technological changes in its products and plant. Too often is hasn't given the same care to its managers and the organization in which they work. Here are two important symptoms (in many ways they're interrelated):

1. In spite of the tremendous emphasis on management development, many managers have jobs which are over their heads.

2. Staff-line conflicts are cutting management efficiency. The small,

Company Growth

Diversification

Increased complexity of doing business

Those are the factors bringing new pressures on the manager's job. Problems they have created in staff-line relationships have cut into management efficiency. Here are four approaches toward improvement.

FLETCHER C. WALLER

Vice president
Bell & Howell Co.

Line-Staff Balance Needed

The pendulum in American management appears to be swinging toward overemphasis on staff functions. This could pose a threat to the development and retention of good line managers in the future.

HORACE Y. BASSETT

President
Calumet & Hecla Inc.

Climate Begins at the Top

Top management's attitude toward the staff functions plays a key role in staff-line relationships. When the activity is viewed as a necessary evil at the top, that's generally the way it's treated at all levels.

rapidly growing firms are having difficulty integrating newly established staff functions. Many of the large multiplant firms which shifted radically and swiftly from centralized to decentralized operations are retrenching toward centralization. Because managers are human, the mere labeling of line and staff guarantees some conflicts.

Our Jobs Are Tougher

How does a man get into a job that's too deep for him?

It's easy, agreed the executives contacted by STEEL. Nearly all of them spoke of situations within their own companies. Four reasons stand out:

• **Practically every manager job has increased in complexity.** Some managers who have been in the same post for the last 15 years have not been able to grow with their jobs. Today's successful manager is a better manager than his predecessor—and his successor will need even greater talents to compete tomorrow.

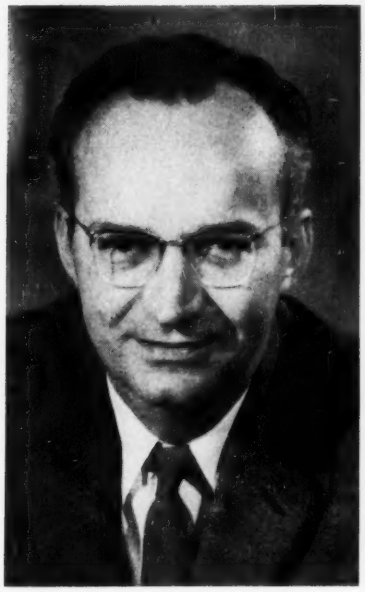
• **Company growth.** Most of the managers in a company doing a $10 million volume have a substantially different job (even though their function remains the same) when the firm grows to $60 million volume. Some managers are unable to make the adjustment from close, personal contact to impersonal, remote control.

• **Poor judgment in promoting managers.** Examples vary from "Joe has helped us fight the good battle, and he deserves it" to mistaking good performance in one job for potential to do another.

• **Lack of talent.** Busy executive recruiters like Heidrick & Struggles, Chicago, report that most firms want them to find replacements for people who couldn't deliver. "The personality conflicts (see Page 107) create some executive turnover," says John Struggles, "but in our experience most of the turnover is due to lack of ability."

Facing Up to the Job

How do companies meet the problem of the misplaced manager? The recession of 1958 provided an



FRANK CATLIN

Manager, Marketing Development
Magnaflux Corp.

Sell Staff's Role

The addition of staff functions to a corporate activity creates many growing pains. Management must first learn and define the functions of staff. Then it becomes the job of the staff man to sell, not try to force, his services to line managers.

SILAS CATHCART

Vice president
Fastex Div., Illinois Tool Works

Line Men Still Decide

Line managers, from foremen up, must retain decision making responsibilities. Staff managers are experts in their speciality. The effectiveness of any line manager depends upon how well he integrates staff services.

out for many companies to discharge him.

Horace Y. Bassett, president of Calumet & Hecla Inc., and most executives prefer the "human engineering" approach. "When you look at the problem objectively," explains Mr. Bassett, "you're doing both the company and the individual a service by explaining the situation.

He Can Take It

"Naturally it's quite a shock to the individual when you tell him he's not touching all the bases and that you'd like to downgrade him or move him to another spot. But many men will already have an inkling of their shortcomings and probably be under internal pressure because of it. I think too many of us underestimate the ability of the individual to make the adjustment and be happier in a job he can do well."

Some executives prefer reduction in job content to out-and-out downgrading and risking the loss of the individual. The technique has a double advantage. Frequently a manager has a combination of important strengths and important weaknesses. Analysis of manpower within that particular function often presents an opportunity to offset one man's weaknesses with another man's strengths. The situation may permit the upgrading of a man who might otherwise be hindered from advancement because of the lack of an opening.

"Promotion from within" policies and salary structures have been major contributors to the misplaced manager and staff-line conflict problems. Engineering, research and development, and sales are the areas most affected.

As companies grew and expanded, the seemingly logical thing to do was reward performance and seniority with promotions when openings appeared. And in most companies, getting into administration was the only route to higher status and salary levels.

But what happened?

The young, ambitious district sales manager who "took over a dog of a territory and built it up to one of the best," was brought back into the home office as sales manager or assistant sales manager. He was expected to generate sales campaigns and transfer his enthusiasm and techniques to the other salesmen.

Frequently it worked. But too often the individual couldn't make the transition. He was adept at the direct contact type of activity in which he could readily see and measure tangible results. In the management role he was one or two steps removed from the firing line. He had to work through other people. The results of his activities were often difficult to measure in terms of his own personal performance.

Similarly, the crack engineer and researcher who were kicked upstairs often turned out to be poor administrators.

Executives also point out that there have been an equal number of staff men who have been promoted to line responsibilities and couldn't make the shift from a consulting and service function to one that requires execution.

Don't Forget Pay

Another point: It's time to take a new look at salary administration. Some progress has been made in the research and development areas by providing parallel progression opportunities for both the career and administrative researcher. More study needs should be made in other areas. Management skills are vital, but an organization does not exist without the specialties—many of them staff functions. Commented a Detroit executive:

"The nonmanagement specialist shouldn't be penalized for remaining in his field. It isn't difficult for us to identify situations in which the subordinate position is contributing more to the firm than the administrator over that position. It's time we began searching out a more equitable method of salary administration."

If the management or administration function remains the chief avenue to improvement, more and more competent specialists are going to be frustrated. Reason: Mathematically, the odds are against most of them ever becoming managers.

The emphasis needs to be toward:

1. The identification of the real aptitudes, strengths, and weaknesses of the individual.
2. The focusing of the individual's efforts on the activities for which he is best suited.

Such emphasis will also help you tailor more effective development programs. The specialist who does not have managerial ability can be broadened within his own specialty; the individual with the potential to be a manager can be channeled into activities which develop those skills.

One of the biggest weaknesses in the tremendous management development movement of the last ten years has been the poorly conceived rotational assignment, observed a Chicago consultant.

Most of the rotation has been among specialities, designed to give the individual exposure to a variety of activities. Too often, knowledge of activities is not the most important objective. It is more important to assign the management trainee to different positions which require him to exercise a variety of management skills.

Spotting the Potential

To cut down the odds of putting managers into jobs they can't handle, more and more metalworkers are turning to industrial psychologists for guidance in hiring, setting up development programs, and in promoting—particularly in the upper middle and top management echelons.

"Too many people view the psychologist as operating like a pharmacist in that he peddles formulas and gadgets," cautions Dr. J. Elliott Janney of Rohrer, Hibler & Replogle. "Certainly we use intelligence, aptitude, and personality inventory tests, but they are only aids which backed up with interviews are used to make clinical judgments. And the quality of the judgment is only as good as the man doing the work.

"The major waste in manpower today is its haphazard use," stresses Dr. Janney. "The psychologist can assist in providing management with accurate appraisals with respect to:

"1. Status and effectiveness of the manager in his current job.

"2. The promotability and potential of the manager.

"3. The development needs to realize his full potential."

Here are the five criteria the psychologist uses in making appraisals:

- **Intelligence**—the ability to think logically, analytically, and comprehensively with both concrete and abstract ideas.

- **Emotional control**—the ability to maintain a steady and effective output under varying and trying circumstances.

- **Skill in human relations** — the ability to deal effectively with people of various types in face-to-face situations and to exert effective leadership.

- **Insight into human behavior**—the ability to evaluate oneself and carry out remedial procedures. The ability to understand the motivation behind the behavior of others.

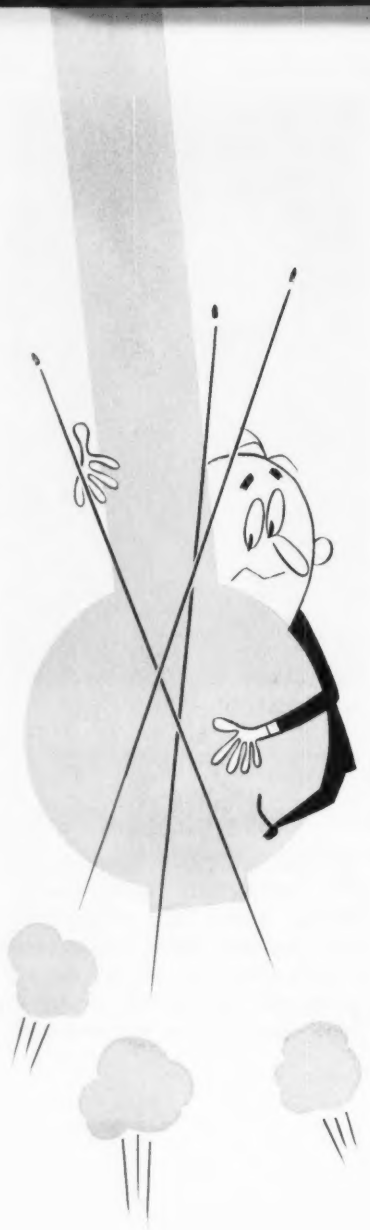
- **Ability to organize and direct the activities of others.**

Good managers and good organization are twin keys to effective management. Replace three or four key managers and you can change the character of a company. Similarly, juggle the organizational structure at key points and you can change the company's personality.

Takes More to Do the Job

Get your company's organization chart and the one it used 10 or 12 years ago. Compare the number of boxes in the new and old. The number of changes and the functions which had to be integrated reflect only a minor part of the transition problem.

People problems generated the most headaches. Looking back at successes and failures during the transition, most metalworkers admit: If each managerial change had been given as much attention and consideration as a $25,000 investment in equipment, fewer pain killers would have been consumed.



The running battle . . .

(line)	(staff)
I call the shots around here, Buster.	**Here's what's needed. Adopt it, or I'll take the matter upstairs.**
He's just staff—has no authority.	**How can I do an effective job without proper authority.**
I'll whistle when I need you —then jump.	**You can't reason with those guys, they think they're experts in everything.**
The line is where the money's made.	**The line is where the money's lost too.**

The atmosphere for effective relationships . . .

- Grapevine information is unnecessary. Managers find out what they need to know—not just what others think they ought to know.
- Managers expected to administer programs are consulted when they are being developed.
- Important decisions are made only after consideration of all points of view—weight of evidence replaces wave-of-hand decisions.
- Status and position are no barrier to effective collaboration.

In practically every change, the manager involved both gains and loser functions. For the rugged individualist used to running the show, the release of responsibility is often difficult. He rationalizes: "I have to keep control of it so I know what the score is."

But the increased complexity of doing business, accompanied by competition more intense than ever, is forcing the introduction of more and more specialists—the staff functions. How smoothly and effectively the new functions are integrated depends upon the atmosphere and philosophy that management provides.

Attitude at the Top Counts

"When top management looks upon an activity as a necessary evil or something that should be done because its the management fashion, that's generally the way the activity will be treated at all levels," says Calumet & Hecla's president. "Recognize the function as the constructive and necessary tool that it is, and integration will be smoother."

He cites the example of the controller's function in his and other firms. "The controller was formerly considered a bookkeeper. When a line manager wanted cost figures, he developed them himself. But as the value of cost control was recognized, management added the required stature to the controller function. Equally important, the controller's attitude changed too. He went into the plant to learn what was going on. He showed line managers how to analyze costs and helped develop the methods to use."

"The staff man joining the organization has to be an expert in human relations as well as in his own speciality," contends R. O. Schiebel, vice president-marketing at Magnaflux Corp. "First, he has to sell the idea to line people that his services are going to help them in their job. Then, in the situations where he takes over some of the functions line formerly handled, he has to prove he can do the job better.

"In the early development of our company, our field sales engineers made all the customer contacts. They analyzed the problems, came back to the plant and engineered the installation needed, and did most of the liaison between the draftingroom and the end of the production line to see that the equipment was shipped. We depended upon them for many marketing functions too.

"Company growth—and competition—necessitated that we bring in staff functions such as market planning, sales promotion, concept engineering. The field sales engineer is still a key man—he is still the primary customer contact man; he analyzes the problems; but he feeds the information to engineering for the solution and design of equipment. Others take over follow-through functions; a specialist takes on the marketing development activities; and the sales engineer devotes more time to his basic job of selling."

Some Danger Signs

Some executives see danger in the mushrooming of staff functions in industry. One possibility is the

weakening of line management and the leadership it needs to function effectively.

The most quoted example is the foreman. Yesterday he was a top line manager in every respect: He hired and fired, scheduled production in his department, handled the training of workers and safety programs, was responsible for quality control, and had to make sure materials flow fitted his production requirements.

Observers point out: In too many instances we've shorn the foreman of too many prerogatives and in the process have weakened him and his effectiveness as a first line manager. In many instances the blame must be placed on the foreman—as the staff services were made available, he abdicated his responsibility voluntarily instead of using the services as a management tool. In other instances, top management has taken away much of the foreman's traditional authority in its alignment of staff-line responsibilities.

Most of the executives contacted by STEEL agreed with the philosophy of Silas Cathcart, vice president and general manager of Illinois Tool Work's Fastex Div. He believes that final decision making responsibility must remain with line functions. Staff functions and services are necessary tools, and the effectiveness of any line manager will be proportionate to the degree that he uses them wisely.

Staff Overglamourized?

Fletcher C. Waller, vice president at Bell & Howell, sees another danger in the apparent overemphasis some firms are placing on staff functions. It may hamper industry's efforts to attract capable young men into line functions.

The accelerating need for specialists in the postwar period has added glamour to the staff jobs. The new titles have helped—a comparison of titles like market analyst, wage and salary administrator, value analyst, and methods and procedures specialist with foreman, department supervisor, and engineer proves the point. And in too many instances injury has been added to insult: The demand for specialists has driven their salary ranges above those of line people.

Mr. Waller's concern was confirmed in a recent experience at an eastern school. In talking with a group of 140 graduate students, he learned that only two young men were considering line jobs. Some of their thinking was reflected in this comment to him:

"You should know better than any of us . . . about the advantages of having a trade or skill that can be packaged and sold to practically any kind of company. Staff specialties are more mobile—you can get up the ladder faster."

Perhaps we have overglamourized some of the staff functions, admit some executives. "But," they counter, "it's a fact of life that the trend toward the increased use of these specialists will continue—the growing complexity of doing business will not reverse itself. The day of the successful autocratic two and three man management team is gone."

Those executives view the staff-line conflicts from a different vantage point. They feel that continued emphasis on "you are line with executing responsibilities" and "you are staff with service responsibilities" will only widen the cleavage.

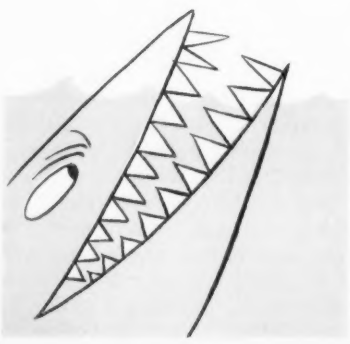
Lessons from Decentralization

More than the organizational structure is involved. The concept or philosophy of the management process is equally important. Some of the lessons were learned in the rapid decentralization movement.

Part of the philosophy of decentralization was to recapture the creativity of the individual entrepreneur—making the activity autonomous. But practice indicated that the central organization must exercise some control. Experience also demonstrated that we gained little motivational value from trying to create and stress the entrepreneur atmosphere.

The strongest motivation in an organization always has and always will be the satisfaction derived from the giving of one's self in an atmosphere of mutual respect and acceptance. That premise, some managers are beginning to believe, is the key to eliminating the major staff-line conflicts and improving management efficiency.

One of decentralization's big sell-



Watch for these indications of . . .

The Manager in a Job 'Over His Head'

FRANTIC FRED begins to lose his temper with increasing frequency. At first, associates discount the emotional explosions as stemming from "a bad cup of coffee this morning" or "a spat with his wife." Industrial psychologists point out that often the manager is dimly aware of his problem and fears he's losing his grip—hence it doesn't take much to trigger his temper.

BUSY BOB has trouble meeting deadlines and making decisions. This manager often displays nervous characteristics and gives the impression of being tremendously busy. He works on one item, then another, and still another—and is generally surrounded with uncompleted undertakings. The fear of reaching the point where he has to make a terminal judgment constantly harasses him.

GEARLESS GEORGE lives in the past, can't shift from the old to the new. Conscientious and hard-working, he's not necessarily the older manager. But he can't visualize the advantages and adjust to the new procedures and processes required to keep pace with the times. He'd rather play it safe and do it like it has been done successfully for the last 15 years.

Technical competence isn't enough . . .

Personality Conflicts Cut Efficiency

1. **When social ambitions conflict with job responsibility.**
2. **When the intellectual manager has no respect for the "doer."**
3. **When the doer has no respect for the planner.**
4. **When the manager is overgressive and is unable to win respect.**
5. **When the manager consistently displays an unwillingness to resolve differences with others when there's disagreement on objectives and methods.**

ing points was the aim to improve performance by making managers accountable for their results. But some thoughtful managers contend: Don't such efforts stem more from alignment of responsibilities than from decentralization per se?

Eliminate Staff-Line

Bert Walter is one of metalworking's most avid proponents of taking a new look at organizational alignment to improve staff-line relationships and boost management efficiency. The vice president of industrial relations for Clark Equipment Co. emphasizes:

"I think a good starting point would be to eliminate the terms line and staff. We should stick to function and responsibilities."

An organization is a group of related activities, each sharing in the total enterprise, he points out. In practice each specialty—the staff functions—actually has "executing" as well as "service" responsibilities.

To get a better realignment of responsibilities and to eliminate the staff-line concept, Mr. Walter suggests breaking down the organization into all the functions needed to operate the business. Group them into logical working units of responsibility.

"And I suggest eliminating the word authority from all job descriptions," he adds. "Of course there must be authority—just as in every family the father has approval or veto power. But the father is not the expert in everything, and the happiest families are those in which everyone has responsibilities and shares in the activities as a functioning unit. I feel organizations can function effectively with the same philosophy."

Mr. Walter's approach puts a new perspective into organization. There are no second class citizens. It points out to each manager:

You are a specialist in a given function. You have these responsibilities—they may be vertical or they may cut across several departments. You will be held accountable for results in your sphere of responsibilities. Because of the great interdependence of functions required to operate a business successfully, you will need assistance from other managers to do certain activities in your sphere. If you use their services and they fail, it is their responsibility. If you do not use their services and fail, you are accountable for two mistakes: You failed in your sphere, and you made another manager fail because you made it impossible for him to do his job.

With such specialization, all managers are free to concentrate on their jobs. When you attempt to

Line-Staff Concept: Is it Obsolete?

"I think it is," emphasizes Bert Walter, vice president-industrial relations, Clark Equipment Co. "The terms themselves create the problem and tend to reduce management efficiency.

"Operating a business is too complicated for one or two individuals to call all the shots. An organization is made up of groups of complex activities which share in the total endeavor.

"We would do well," he points out, "to substitute functions and responsibilities for line and staff. This could be the approach:

- **"Break down the organization into all the functions or activities required to operate a business.**
- **"Group these activities and functions into logical units for effective performance in relation to the total enterprise.**
- **"Each manager of these functions then should be given specific responsibility for his activity.**

"Obviously some functions—accounting, purchasing, industrial relations—cut across many lines. When responsibility is defined in terms of the total enterprise, it becomes two-pronged. The manager is responsible for: 1. Executing the program in his own sphere. 2. For supporting other managers in the execution of theirs.

"The development of interdependence among, not the separation of, functions is the key."

Bert Walter

do another man's work, you weaken your function and his function.

How About Your Job?

Take a look at your job. What activities could you take on to do it more effectively? What activities do you think should be delegated for maximum effectiveness?

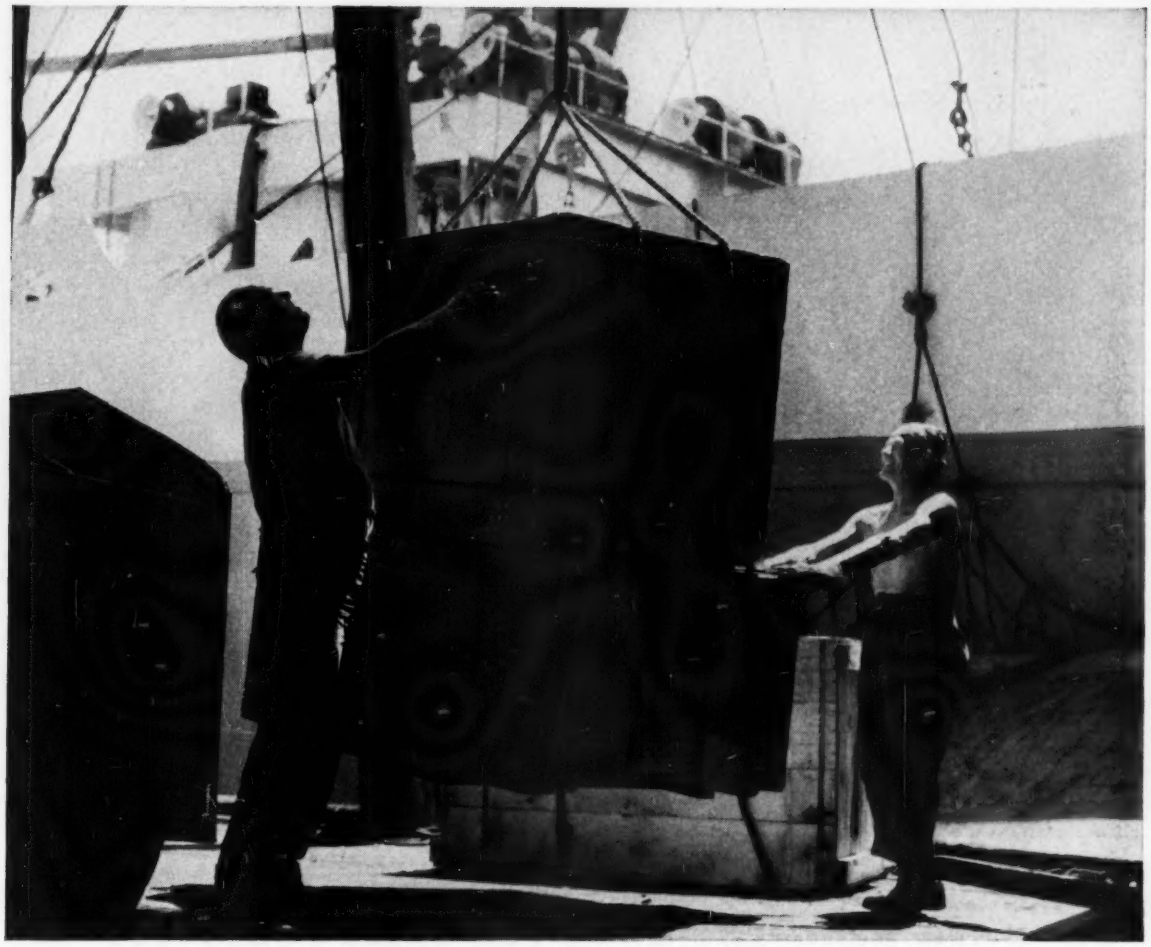
Those questions will become more and more important as our jobs and the over-all operation of a business continue to become more complex. Organizational charts will have to be more flexible than ever before so that the individual and his skills can be more accurately aligned to a responsibility area.

And management will have to pay more attention to making sure that there's complete understanding of the responsibilities of the individual's job—this is the best insurance against frustration, confusion, and friction among managers and their people.

All companies have access to the same modern plant and equipment as their competitors. The major difference in the effectiveness of companies is determined by people and the management philosophy under which they function.

The increased complexity of doing business suggests that perhaps more interdependence—not separation—of management functions should be stressed. And in measuring performance, of a function as well as that of an individual manager, value should be measured by the contribution to the whole enterprise, not necessarily by the performance of the activity alone.

There is often a difference.



There goes another consignment of red ink

The salesman spent a week in Bermuda on his commission. The front office rejoiced. But the company lost money.

What was wrong? Factory overhead.

This company has a plant-wide burden rate. All costs are based on it. In some departments, actual overhead is *less* than the standard rate. Profits are high. In others—notably those which turned out these assemblies—actual overhead *exceeds* the standard rate. Prices don't cover it. Profits are seldom—if ever.

How different with Automatic Keysort Data Processing! With Automatic Keysort, the Plant Manager can pinpoint burden charges by *department* . . . and prices may be set to allow for profit in each operation. Because plant operating figures are reported *on time*, unrealistic overhead rates can be quickly spotted.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Automatic Keysort will give you all the fast, accurate information you need for modern management control of every factory operation. And at remarkably low cost.

To learn more about how Automatic Keysort Data Processing can fulfill *your* need for timely, comprehensive facts and figures, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, New York for brochure FS-43.

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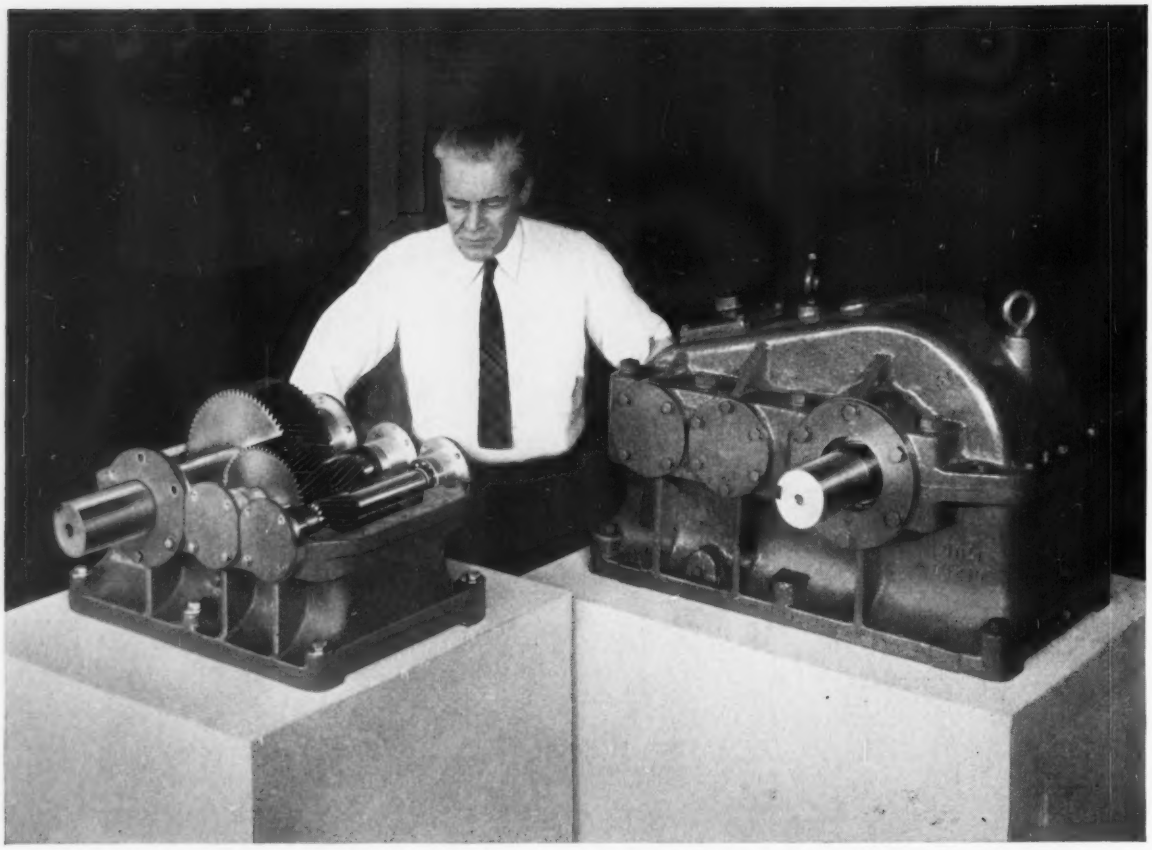
NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION



BOTH REDUCERS HAVE THE SAME CAPACITY!

This dramatic saving in weight and space is possible only because the reducer on the left has Philadelphia Precision Ground Gearing . . . a new development, so significant you can solve drive problems you could never solve before . . . because you get engineering advantages that have never been available before.

For the first time, standard commercial speed reducers are available with gearing of master gear quality. Extreme accuracy of profiles, profile spacing and surface finish reduce dynamic load factors. Harder gear materials can be used. Result: increased load carrying capacity without sacrificing performance characteristics.

Gear noise is reduced to the point where it is no longer a controlling factor in applications where low sound levels are important.

Backlash is reduced in reversing drives . . . and it is uniform where precision of movement is important.

Vibration is virtually eliminated because tooth to tooth errors, accumulated pitch errors and composite errors are reduced . . . smoother contact results.

Longer gear life. Improved accuracy and better surface finish eliminates "running-in" periods and the resulting wear on gearing.

If you have a new product on the boards . . . design changes coming up . . . or new drive requirements of any kind, Philadelphia Precision Gear Drives may give you the competitive edge you've been looking for. Write for full data on precision ground gearing in spiral bevel, parallel shaft and In-Line reducers as well as gearmotors and Motoreducers. If you have a special drive problem, the full facilities of our engineering staff are available to help you find the solution.

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INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

BENDABLE ALUMINUM CASTINGS— Exceptionally high elongation and impact strength make a new castable aluminum alloy particularly attractive to furniture makers. Called Adaptaloy (American Smelting & Refining Co., New York), it's also used for forming dies.

LEAD ADDS EYE APPETL— A synthetic mother-of-pearl coating based on a combination of lead compounds is interesting auto designers. The coating replaces natural pearl essence (guarine) and can be made in a variety of tints.

TITANIUM PROGRESS NOTE—A new titanium alloy is said to be superior to previous types. Developed by the research division of New York University, the alloy has a tensile strength of 200,000 psi at an elongation value of 8 per cent. Reduction of area is 18 per cent. Description: Ti-6Al-6V-2Sn-0.5Fe-0.25Cu.

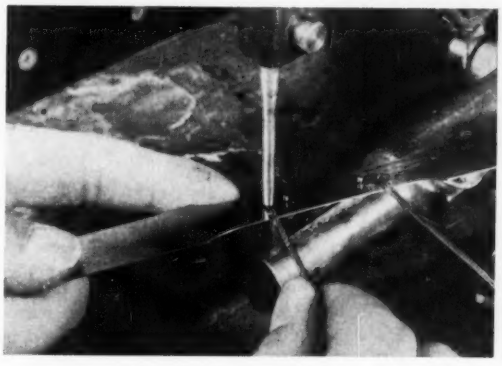
LOOK FOR MORE HONEYCOMBS—Air Force policy apparently favors increased use of honeycomb structures, it was revealed at a recent symposium on nondestructive testing. Reason: The structure minimizes sonic fatigue, a major problem in tomorrow's air vehicles.

BOOST FOR ULTRAPURE METALS— Electronic needs and research into ultrastrong alloys have spurred demand for ultrapure metals, says American Smelting & Refining Co., New York. Ultrahigh purity copper (99.999 per cent) is an almost perfect electrical conductor at absolute zero. Ultrapure arsenic alloys are being added to the transistor family. One firm reports commercial production of ultrapure cadmium (99.99 per cent plus).

GAS DETECTS TINY LEAKS— Radioactive gases are an excellent testing medium for hermetically sealed units, finds Potter & Brumfield Div., American Machine & Foundry Co., Princeton, Ind. One gas (Radene III) enables an instrument to detect leaks which are 10,000 times smaller than current military standards. Production people can use the method with simple go-no go instruments.

UPGRADED INDUCTION FURNACE — Pure zirconia (or thoria) is the heating element in a unique 5000° F furnace just installed at E. I. du Pont de Nemours & Co. Inc. experimental station, Wilmington, Del. Radio frequency heats the element which becomes more conductive at high temperatures. The unit will be used for soldering, levitation melting, and brazing.

TITANIUM-CLAD HITS MARKET—The first large titanium clad vessel (it's 4 by 12 ft) has proved successful in operation, claims Chicago Bridge & Iron Co., Chicago. A-40 titanium is laid over mild steel. The firm says its regular Hortonclad will soon be available with titanium surfaces.

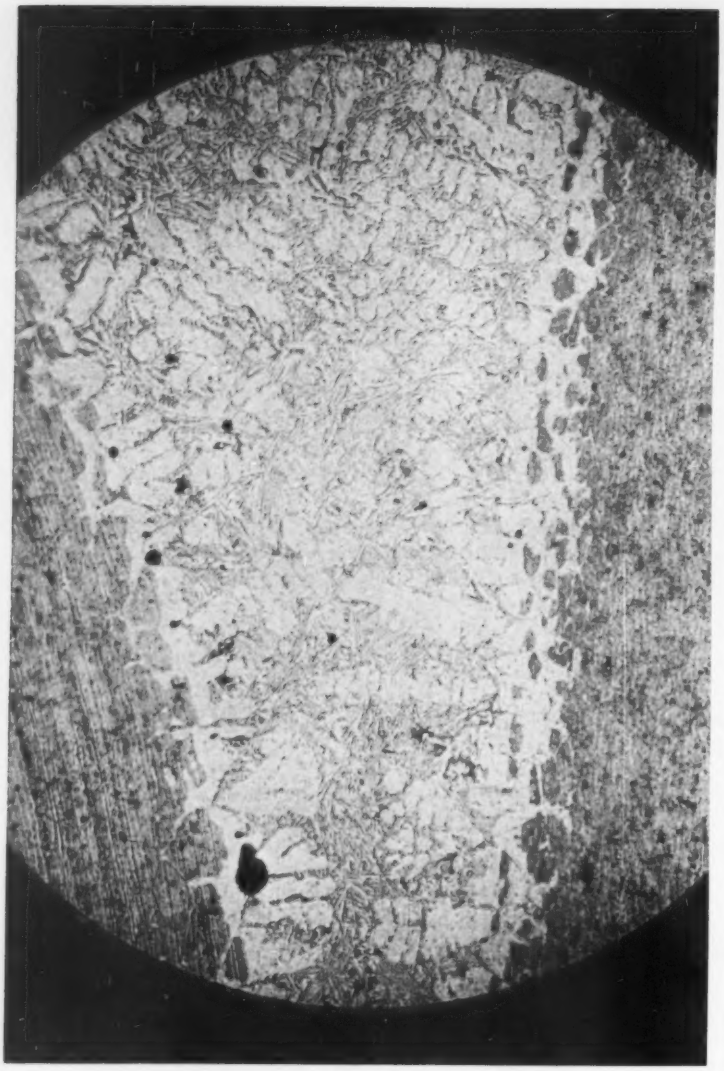


STEEL BALLS ARE WELDED precisely to high temperature metal specimens prior to tensile tests. Boeing Airplane Co., Seattle, says the 3/32 in. balls prevent slippage and minimize distorted readings of plastic flow. The balls attach to sockets in an extensometer and eliminate the slippage often experienced when protrated heating makes the clamps relax their bite

Aluminum Brazing Paste Saves $175,000 At Martin

Powder is made up into a brazing paste by adding water. It has eliminated sheet and wire preforms, simplified assembly, produced better joints. Many joints are made simultaneously. Process has replaced fusion welding on many parts

By DON WERNZ
Supervisor
and
MEL SCHWARTZ
Senior Manufacturing Engineer
Manufacturing Research & Development
Martin Co.
Baltimore



Photomicrograph (X100) shows section through a brazed joint. Typical cast structure of the brazing alloy can be seen, and the bonding to the wrought metal is apparent

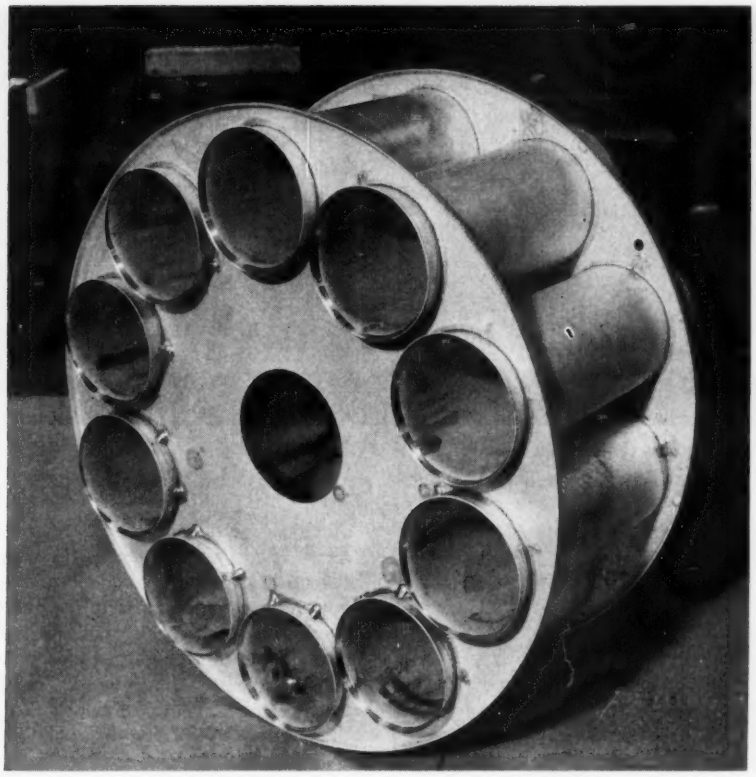
ALUMIBRAZE, a paste brazing filler for aluminum, has reduced preparation time for brazing by as much as 95 per cent while improving product quality and process efficiency. It was recently developed by the manufacturing research and development section of Martin Co.'s Baltimore Div.

In the first 18 months of use at Martin, savings are estimated at $175,000.

• **Setup Simplified** — Alumibraze, is supplied commercially in powder form by Handy & Harman, New York. It is made up with water into a paste which contains metallic aluminum brazing alloy and other ingredients. It is applied with a brush. The sheet and wire type filler formerly used required the cutting and fitting of preforms for each joint.

The problem of voids caused by flux entrapment is virtually eliminated with the use of paste. Sheet and wire filler metals start to melt at the outer edges and progress back into the joint. Air and flux are not completely eliminated, causing voids and flux inclusions. The paste, in a finely divided state, is more readily melted than sheet or wire. The molten mass flows directly to the joint, pushing the molten flux of the salt bath ahead of it. Result: Solid braze metal with few, if any, inclusions — as shown by machining of the joint.

There is a significant reduction in the cost of tooling—components can be held by tackwelds of 2S aluminum. The compound is then spread along the joint. If fixturing is desired, a plate with a few springs to hold the components during dipping will suffice.



Ten tubes, tackwelded to hold them in position during welding, are brazed to two flat sheets. Twenty perfect joints are formed simultaneously

• **Tooling** — Although the tooling for dip brazing is usually simple, the material used is of utmost importance. For normal or short run assemblies, Type 301 stainless is recommended. Inconel is better for extended service. Springs are fabricated from Inconel X, to retain properties even after repeated cycles through the furnace.

Temperature control is extremely important, and the control system must be checked constantly. Temperatures between 1100 and 1120° F are generally used. Little deviation can be tolerated. Higher temperatures will gradually convert the as-wrought structure of the parent material to as-cast.

At Martin-Baltimore, the Ajax-Hultgren salt bath furnace used for the dip brazing flux consistently holds 1100° F within 2 degrees on either side.

• **Results Document Savings** — Among the first jobs on which the new material was tried was one that originally required Type 718 aluminum brazing sheet. Prepared preforms of the sheet, with individual holes, were required for proper brazing clearances—and the preforms themselves required forming, fitting, and cleaning prior to dipping in the furnace. In comparing assembly times, 10 hours were saved on a lot of 200 assemblies by using Alumibraze.

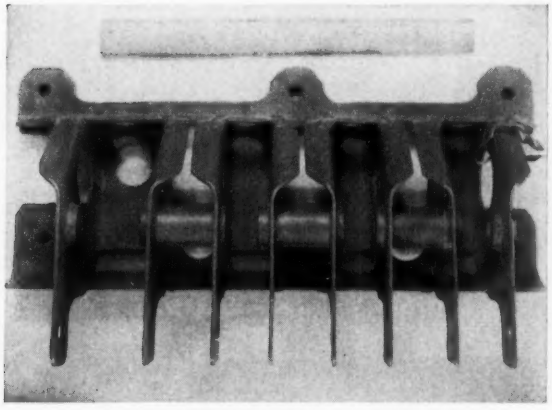
Another problem involved an 18 in. aluminum bar which required a square hole through its entire length. The bar was cut lengthwise and a square slot machined in each half, after which a braze was attempted, using conventional sheet as the brazing material. The brazed part was turned to a circular outside diameter and threaded. During the thread chasing, skips and voids were discovered along the brazed joint. Those imperfections caused 22 of the first 30 bars to be rejected. Alumibraze, new at the time, was tried, and since then 2050 of the bars have been brazed without a single rejection. Over a six month period, savings on this job alone amounted to $12,000.

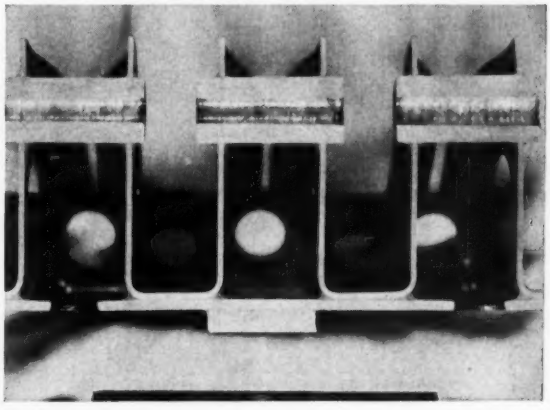
The largest single use for dip brazing is in the fabrication of wave guide assemblies for airframes, missiles, and space vehicles.

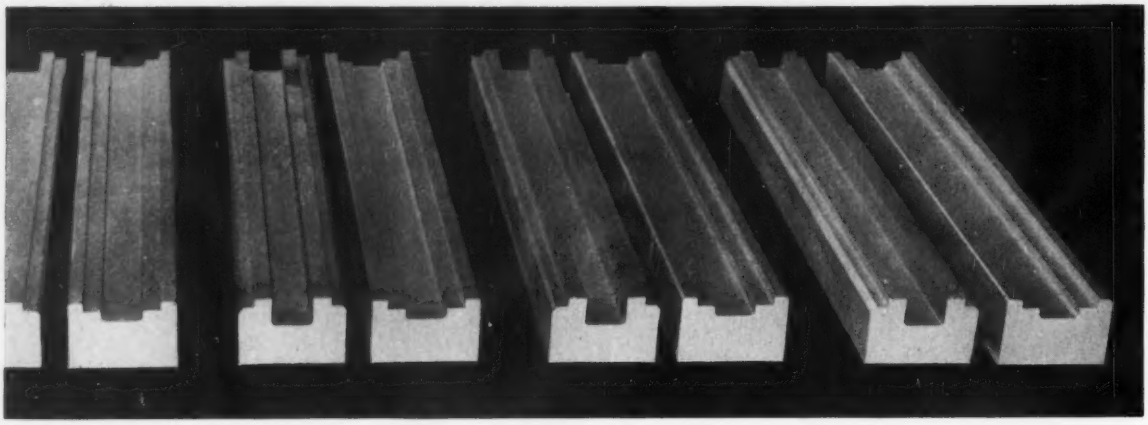
By proper application of the aluminum paste brazing alloy, the size of the fillet after brazing can be controlled for better joints. There is no need for subsequent machining.

• **Better Way** — A common pro-

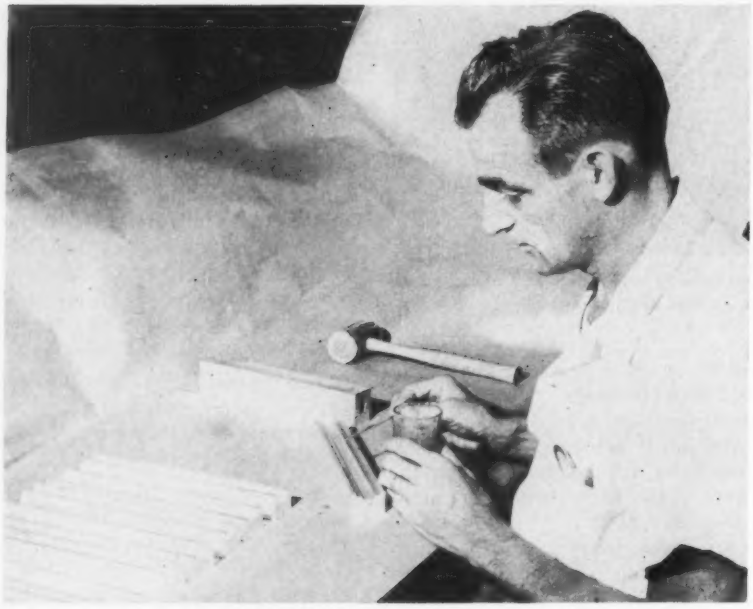
Pulley bracket is typical of the complex assemblies dip brazed (left). Section through the pulley bracket (right) shows uniform fillets at the multiple joints







Aluminum bars machined to form tubes with square center hole

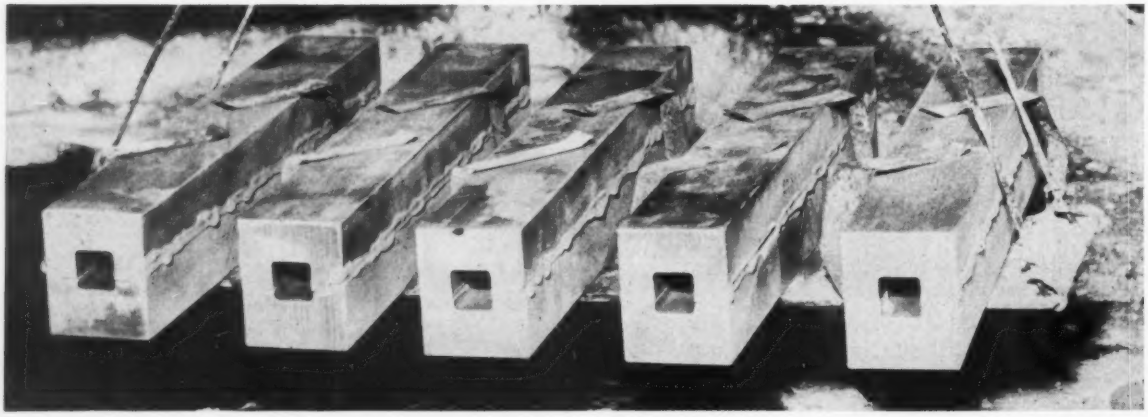


Paste is applied to the machined bars before assembly

duction method, fusion welding, gives results which rate high for structural integrity and reliability, but the method often requires hand operations. After tests had proved that the Alumibraze method gave similar results, a number of parts were changed to dip brazing using the paste. A pulley bracket, for example, was changed to dip brazing with a resulting saving of 50 minutes per assembly. Uniform fillets and even coverage were obtained.

Another case: Ten tubes were to be joined into two plates. A test run was made with Alumibraze, and results were so satisfactory that the manufacturing specifications were changed. The tubes are tack-welded to position them, and the paste is positioned before dipping in the furnace. Record: Hundreds of assemblies without a rejection.

Assembled tubes before dipping in salt bath. Springs hold assemblies in position on base plate



Redesign Whips Competitive Squeeze

In Manufacturing Office Safe-Files . . .

Saved: $16,886.91 annually

LABOR SAVINGS: $15,174.33 Annually

Cutting asbestos for outer walls	0.0165 hour
Installing asbestos on top, back, and walls	0.1316 hour
Time eliminated	0.1481 hour
Time added to perforate and emboss steel shell for vents and assemble the vent plugs	0.0443 hour
Net time savings	0.1038 hour

MATERIAL SAVINGS: $1,712.58 Annually

A total of 10.7 lb of asbestos at 18c a pound	$1.926 a unit
Added material (vent plugs)	0.200 a unit
Net material savings	$1.726 a unit

THE COST CRISIS . . . How to Beat It

Elimination of insulating material helps manufacturer trim his costs while upgrading product quality. The article is an entry in STEEL's Cost Crisis Awards Competition. Another will appear next week

A COMPETITIVE squeeze in the market place can create a nightmarelike situation most manufacturing men hope they never have to face.

That's the way Thomas J. Bowes sums up the problem his company met. A methods engineer for the Remington Rand Div., Sperry Rand Corp., Tonawanda, N. Y., Mr. Bowes says the drop of competitors' prices forced a product re-evaluation of Remington Rand's safe-file. It eventually led to savings of nearly $17,000 a year with no sacrifice in the quality of the product.

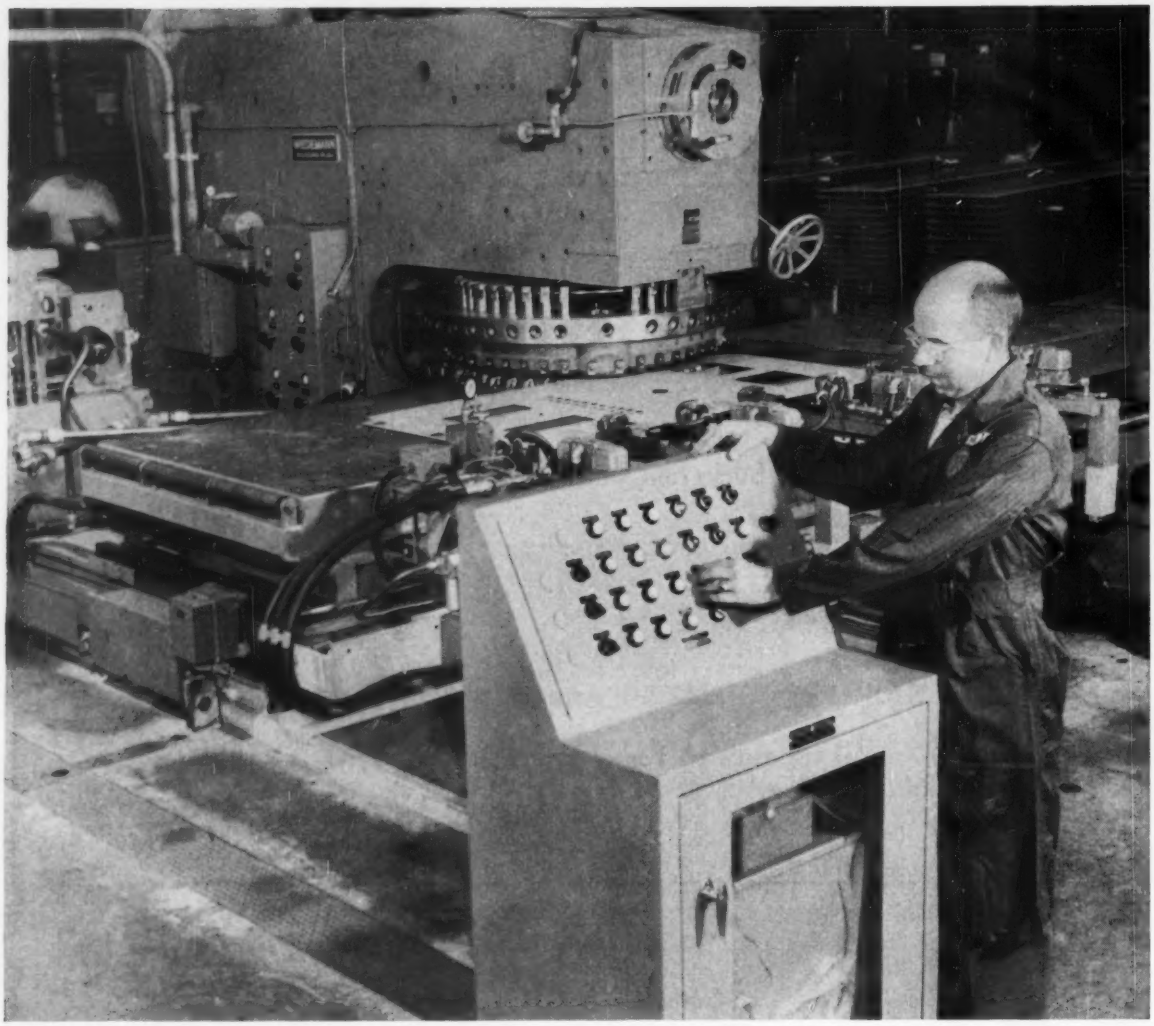
• **Team Attack**—The problem was turned over to the Methods Engineering Clinic, a group of representatives from all phases of management. Meeting once a week, the clinic studies the company's product designs and manufacturing methods to see if better approaches can be found.

One costly operation singled out: Insulating the interior of the file. Gaps between the outer steel walls, back, and top, and the inside plaster molding had to be filled. Sealing cement was spread on the inside of the casing, sheets of asbestos were cut to size and laid in place, and the unit was assembled. It took nearly 15 man-hours to do a hundred parts.

• **Solution** — Engineers decided to increase the size of the plaster molding to fill the gap between the molding and the outer shell.

With the new design, vent plugs had to be inserted in the outer walls. (In case of fire, the vent plugs blow, releasing internal heat and steam.) The operator thus substitutes the job of installing plugs for that of laying the asbestos. The new design meets higher standards set forth in underwriters' codes.

Although several operations had to be added to get the plugs in place, the net saving on each unit amounts to $1.90.



The 1 in. punched tape clicks through a reader in the console (foreground) to dictate the complete cycle of the turret punch press. The operator's job: Loading and unloading parts and starting the cycle

Tape Speeds Turret Punching

Machine guided by numerical control is five times as fast as its manual predecessors. It will punch up to 30 holes a minute, holding location to ±0.010 in.

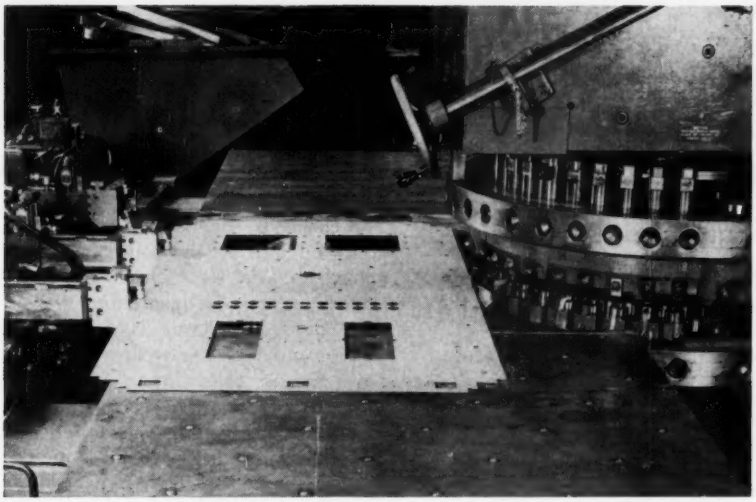
AUTOMATED short lot stamping is a step closer. A tape controlled turret press that automatically locates and pierces holes in sheets or plates at high speeds has been co-developed by Wiedemann Machine Co. and General Electric Co.

GE's Specialty Control Dept., Waynesboro, Va., perfected the control. The department also bought one of the new presses. Dr. L. T. Rader, general manager, estimates it will bring a $48,000 cost reduction the first year.

• **The goal: Get rid of nonproductive cycle time.**

It takes only a second to punch a hole on a turret press, but the handling time between holes is considerably longer—even though the turret press probably has the fastest positioning time of any short lot machine.

Engineers at Wiedemann and



Close-up shows the workpiece clamped in place and moving into position under the turret at right

GE felt sure that with numerical control reading positions and translating them to sheet location, they could drastically trim the production time on complex stampings. The Wiedematic, now guided by tape, will locate and pierce about 30 holes a minute compared with six or eight by comparable nonautomatic Wiedemanns.

• The complete machine cycle is tape guided.

All press functions, including tool selection, material positioning, and piercing, are controlled automatically. Multiple die sets, layout, tool setup, and material handling are eliminated.

The control information is programed on a standard, eight channel, 1 in. punched tape. The operator loads the material on the press table, inserts the tape in the reader, and starts the press. The material is moved in or out, right or left at 600 to 800 in. a minute. At the same time, the turret rotates to bring the proper punch and die into piercing position in less than 2 seconds.

During the piercing operation, the information for the next hole is read, and the table and turrets move immediately.

• GE's appropriation requests show how savings mount.

Emphasizing that a complete review of the economics was necessary to justify GE's purchase of the machine, Dr. Rader explained that his department expected to save $19,000 in the first year in direct labor—a reduction of four men. Indirect labor savings were figured at $6000. A 35 per cent reduction in manufacturing losses should save $5000. The elimination of special punching tools will save $4000. A whopping $20,000 can be saved at GE by eliminating the subcontracting that has accompanied peak loads—the speed of the new machine makes that possible. The simplified drawing-to-part system is calculated to save $3000 a year, and $1000 will be trimmed from overhead costs.

Including $10,000 for depreciation, net savings in the first year are $48,000, Dr. Rader said.

• Inventory reductions can be dramatic.

Dr. Rader explains: "We expect a $20,000 reduction in inventory because this automated press is 400 per cent faster than the manual equipment we had. With our new machine flexibility, we also expect to save 2140 sq ft of floor space (42 per cent reduction) now used for sheet metal storage."

At GE, the machine replaces two manual turret punch presses and some auxiliary equipment.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Programer Cuts Drafting Time 75 Per Cent

Programing time and complexity often become major concerns to numerical control users or prospects. To lick the problem, GE Specialty Control Dept. engineers developed the Auto-Programmer. On its first job (at GE) the device has freed three of the four draftsmen formerly required to make detailed drawings for the press.

A typical job begins with a layout that consists of drafting templates accurately positioned on an outline drawing of the panel. The layout is then secured to the programer.

The draftsman selects turret punch positions; using lighted crosshairs, he centers a locating device over center line markings on the templates. A foot switch transfers the "x" and "y" position of the locating device to a read-out; a second foot switch punches the co-ordinate data on the tape.

Dimensioning of the drawing is unnecessary.

New Macroetch Eases Study Of High Alloy Steels

High temperature alloys have required drastic acid treatment with such nasty concoctions as aqua regia. The new mixture reduces fuming, is easy to prepare, store, and use

A NEW MACROETCHANT for high alloy steels, such as Waspaloy M-252, and Rene 41, has been developed at Carpenter Steel Co., Reading, Pa. Replacing older, more hazardous strong acid mixtures, it is easy to store, does not deteriorate, is readily made up, and does not have to be prepared freshly for each use.

• **Macroetching Reveals Defects**—When a cross section of a steel or alloy bar is etched in acid and examined, much can be discovered about its quality. The sample gives evidence of porosity, inclusions, and voids. It will also show the depth of surface defects such as laps, seams, and tears. Many types of segregation will be revealed if previous heat treatment or working has not caused satisfactory dispersion of the nonuniformities.

With older steels, having a low alloy content, hot acid (sulfuric or hydrochloric) was all that was required to obtain a suitable etched bar. Highly alloyed materials require a stronger medicine. A typical one is aqua regia.

Other potent potions used to attack these corrosion resistant alloys include hydrochloric acid with oxidizing agents such as chromic acid or hydrogen peroxide. Additional disadvantages of the mixtures listed include: Erratic action, making the etching difficult to control; foaming and boiling of the solution, with resultant danger to the operator; and instability, meaning a fresh etchant must be made up frequently. Fumes were also a problem—aqua regia, for example, gives off chlorine in addition to the vapors of the hydrochloric and nitric acids.

• **Simple to Use**—S. M. Purdy, Carpenter Steel's supervisor of physical metallurgy, reports that the new etchant is prepared by mixing one part saturated copper sulfate solution with two parts of concentrated hydrochloric acid and heating the mixture to 160-170° F for use.

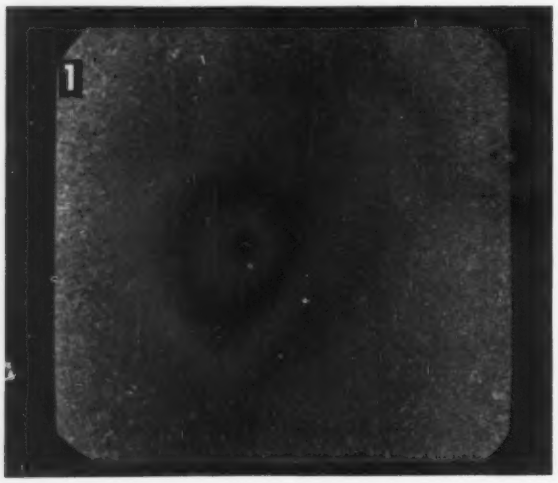
The best way to use the etchant, says Mr. Purdy, is to cover the sample with about ½ in. of the mixture. After about half an hour, the specimen is examined, without removing it from the solution. The greenish acid stays clear and does not interfere with inspection. When the desired structure is developed, the sample is removed, rinsed in water, and dried in an air blast. Examination of the specimen may indicate the etching was not deep enough; if so, the specimen is merely reimmersed. It is not necessary to start over.

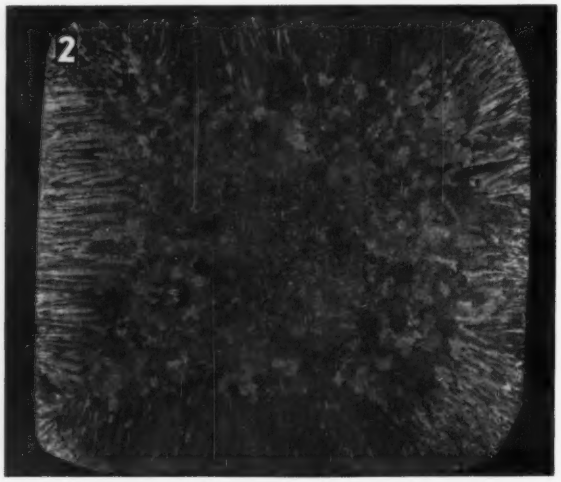
The solution does not show any evidence of deterioration after standing for a week, nor after processing additional samples.

Surface preparation, while important, is not critical, Mr. Purdy reports. The ideal starting material is a ground surface. The surface resulting from cutting the sample with an abrasive wheel is usually suitable, unless "burning" is apparent. If the surface is machined, the results depend upon whether there is cold working or smearing of the metal. In general, ground surfaces are preferred to machined.

Carpenter feels that the mixture makes acid etch inspection of high alloys a more practical test for producers and users.

Macroetched superalloys, showing grain size and macrostructure. Specimen No. 1, Rene 41, showed scattered fine pits in the central portion (dark area in photo), while No. 2, of M-252, showed no evidence of inclusions. Both samples were surface ground before etching for ½ hour at 160 to 170° F





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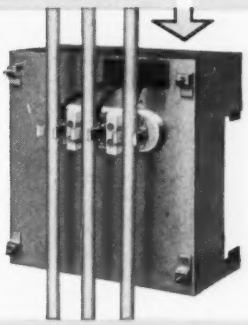

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Wiring channels are *large and accessible*. No wire fishing through narrow passageways—wires can be laid in position—less costly installation.

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EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Blast Furnace Is Updated With Nuclear Stock Gages

Accurate, continuous record of burden level and distribution is available; higher average stock level makes for lower coke rates; less downtime for gage repairs helps prevent losses in iron production

MODERN gaging and control systems may give blast furnace efficiency a needed boost, improving the competitive position of stacks in the steel industry.

Example: A nuclear type gaging system for measuring blast furnace burden level, is used instead of the conventional stockline setup on the Chicago blast furnace of Republic Steel Corp. The system was developed at Republic's Electromechanical Research Center, Cleveland.

• Needed by steelmen: A safer, more accurate, more dependable way to measure blast furnace stock level.

The mechanical stockline has been used for many years to measure the stock level in stacks. Two independent weights, lowered into holes in the furnace top by winches, rest on the burden. The length of cable paid off each winch indicates the stock level.

If the weight system fails, the furnace may have to be shut down for repairs. Time lost reduces furnace productivity (operation without a means of measuring the burden level may lead to furnace damage).

Replacement of weights and cables is difficult (the weights may weigh as much as 600 lb). The job is also a dangerous one because of possible carbon monoxide concentration at the furnace top.

Openings needed at the top of the furnace for weights and cables allow gases and flue dust to escape. That makes for difficult housekeeping and a possible gas hazard at the top of the furnace. Higher top pressures used in modern stacks make such openings even less desirable.

Stockline weights often sink into the burden, or rest in low spots on the surface. That makes stockline indications inaccurate. Because the weight must be lifted to the top of the furnace when the bell is dumped, to prevent burying and possible loss of the weight, stockline measurements are discontinuous.

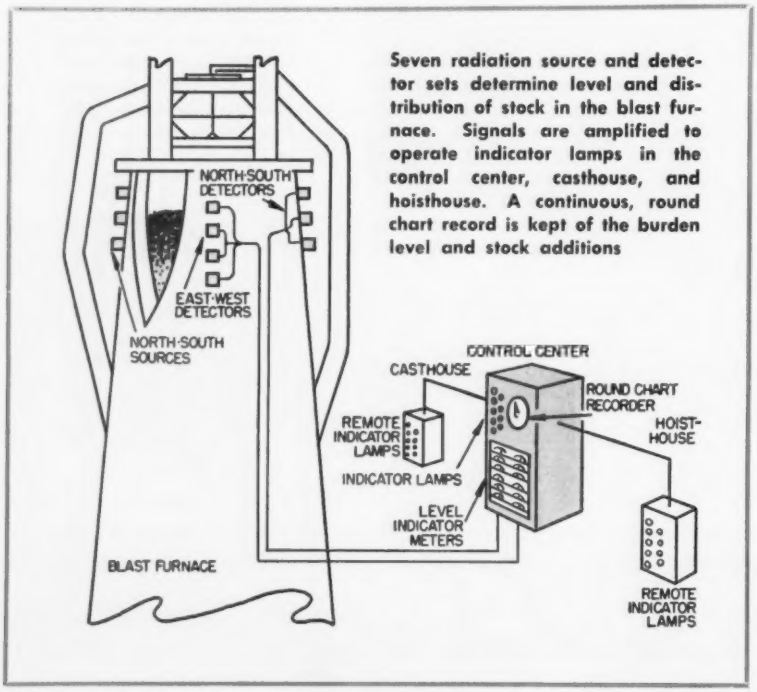
• Republic's engineers considered several nonmechanical gages, then decided on the nuclear system.

Nuclear gaging methods seemed to be the most practical of the systems studied. The proposed setup included radiation sources on one side of the furnace and corresponding detectors on the other side. Each source would send gamma radiations through the furnace to the appropriate detector; the detector would receive less radiation when the beam was obstructed by the furnace burden. Radiation changes, converted into electrical signals, would operate indicator lamps and recorders to show stock movement.

Holders for radioactive sources and detectors were built into one of the company's blast furnaces at Youngstown while it was being relined. Later, a commercially developed gaging system was installed and tested. It failed to operate (readings were the same for a full or empty furnace). The company's engineers decided the nuclear gaging method would be successful only if more sensitive detectors were developed.

• Successful prototype at Youngs-

(*Please turn to Page* 124)



Seven radiation source and detector sets determine level and distribution of stock in the blast furnace. Signals are amplified to operate indicator lamps in the control center, casthouse, and hoisthouse. A continuous, round chart record is kept of the burden level and stock additions

SALES FORECASTING

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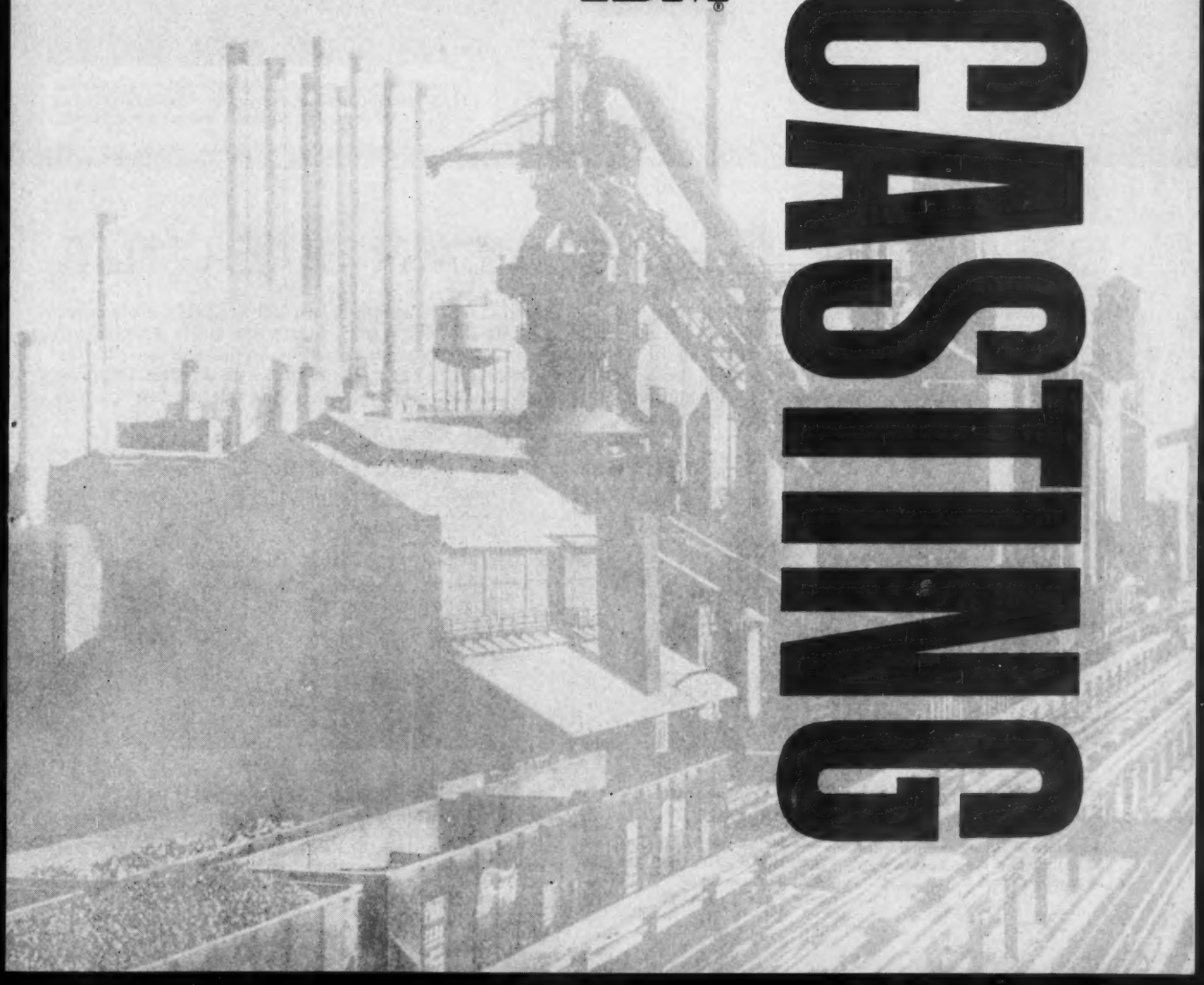
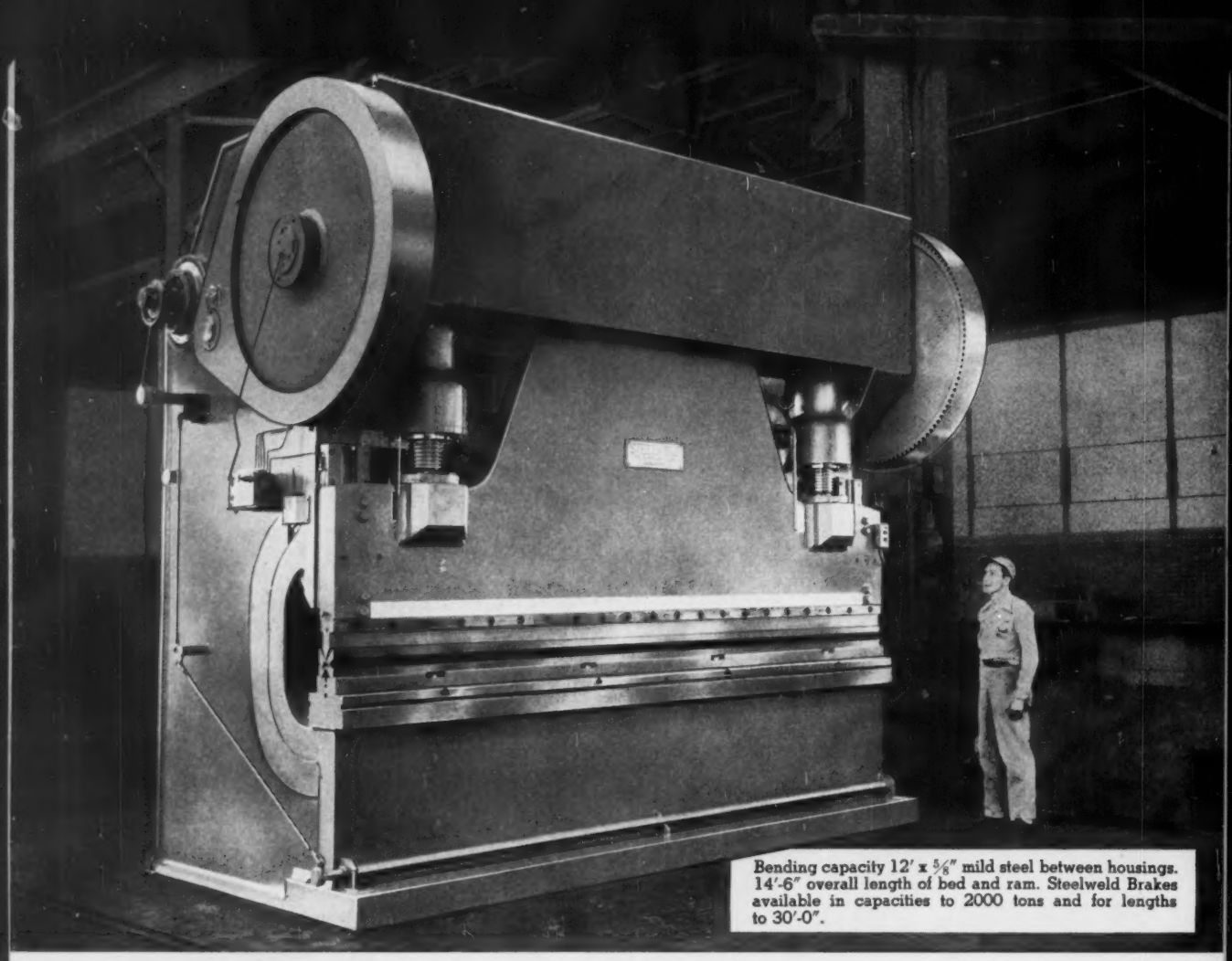




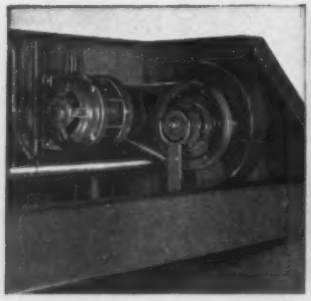
Bending capacity 12′ x 5/8″ mild steel between housings. 14′-6″ overall length of bed and ram. Steelweld Brakes available in capacities to 2000 tons and for lengths to 30′-0″.

BRAKES and SHEARS BUILT

STEELWELD machines are built to withstand the rigors of mass-production high-speed work, as well as meet the needs of jobbing shops requiring frequent set-up changes. They are liberally designed throughout to assure maximum service with minimum maintenance. A wide array of desirable features are provided, some of which are not available elsewhere.

Steelweld Brakes and Shears are easily adapted for special requirements. Our engineers will be glad to work out design changes to speed production, improve safety or bring about other advantages for specific applications.

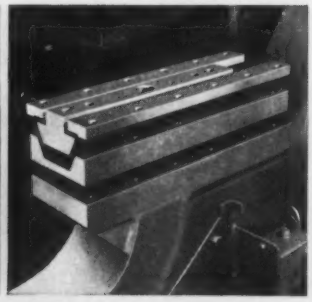
A Few of the Outstanding Press Brake Features



SW-309

Long Life Clutch and Brake

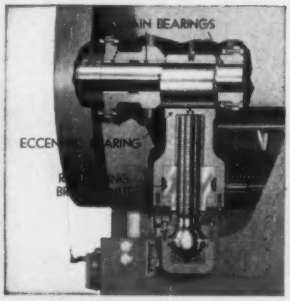
Heavy construction assures long trouble-free life. Clutch unit is duplicate of brake and parts interchangeable. Adjustments easily made without tools.



SW-458

Slides Compensate For Wear Automatically

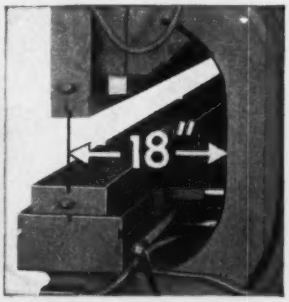
V-shaped slides and guides eliminate loose gibbing. Take up wear automatically. Easily removed and replaced.



SW-304

Six Large Main Bearings

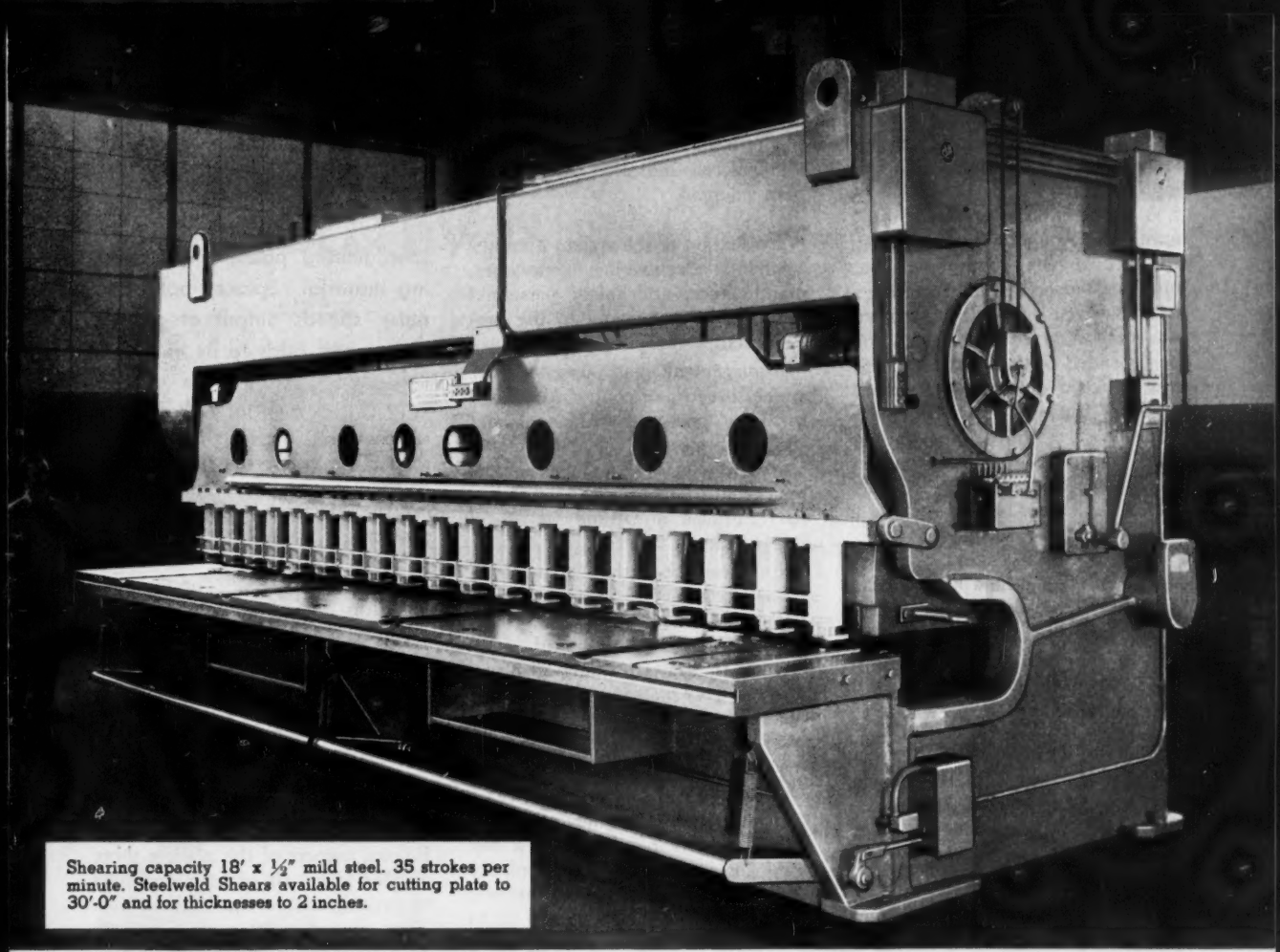
Each of the two eccentric shafts which drive the ram has three heavy bronze bearings. Ram adjustment is made by revolving nut. Screws do not turn; therefor, ball joint wear is reduced.



SW-441

Extra Deep Throat

18-inch throat is standard on all Steelweld Brakes. This permits making bends to 18 inches from edge of plate for full length of dies.



Shearing capacity 18′ x ½″ mild steel. 35 strokes per minute. Steelweld Shears available for cutting plate to 30′-0″ and for thicknesses to 2 inches.

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15. Long knife wear between grindings.
16. Knives easily removed and replaced.
17. All-welded one-piece frame with bed integral.

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Catalogs No. 2010 (Brakes) and No. 2011 (Shears) give construction and engineering details. Profusely illustrated.

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PROGRESS . . .

town led to development of a rugged system suitable for production gaging.

A more sensitive gage was developed by Republic's research staff. Installed in the Youngstown blast furnace, it operated satisfactorily in its first test. But the prototype was a laboratory model and couldn't be depended on for continuous use. More rugged detectors were developed for further tests. They were operated successfully until the furnace was shut down two months later. The company decided to install a multilevel nuclear system in the next furnace to be relined.

The seven level gaging system installed in the Chicago blast furnace includes four source-detector sets aligned in the east-west direction and three sets aligned in the north-south direction. Radiation paths are interleaved to give the system greater accuracy.

For maximum reliability, the north-south system is independent of the east-west system. If one fails, the other is still usable. Circuit design also permits emergency operation of any one of the gages if the other six fail. For easier maintenance, the least possible number of system components is mounted at the furnace top.

Included in the control center of the system are amplifiers to operate indicator lamps and a recorder and relays for future automatic charging. Indicator lamps are in the control center, casthouse, and hoisthouse. A round chart recorder, in the control center, provides a continuous record of the stock level and records time of additions.

• At first, the nuclear setup was used along with the conventional stockline system. When the mechanical setup failed, it was replaced by the nuclear gage system.

Two months after the nuclear system was installed, both stockline weights were lost in the furnace. A shutdown for gage repair was avoided by switching over to the nuclear system. The system has been in use almost a year.

Engineering and maintenance personnel have modified the system slightly to make it more effective. Improvements have been made in recorder calibration, and additional test points have been incorporated in system circuitry. Special recorder charts have been developed, and multicolored indicator lamps have been adopted.

• Evaluation of the system by management, engineering, operating, maintenance, and safety personnel indicates its superiority to the previous setup.

Management has accepted the system because of confidence shown in it by operating personnel and the small amount of training required by electrical and mechanical maintenance crews. Added benefit: Furnace downtime for stockline repairs is reduced.

Engineers feel that changes in basic design will be unnecessary, but component simplification is being considered. Buildup of materials on the furnace lining, displacement of wear plates, or displacement of furnace lining might interfere with gage operation; electrical and mechanical adjustments can be made to keep the gages in use.

Savings in furnace downtime are important when a 1625 ton a day stack loses production every minute it's shut down. Typical shutdown for mechanical gage repairs: 30 to 60 minutes. More accurate gaging of the stock level should make for lower coke rates by providing higher average stock levels.

The nuclear system makes operating and maintenance conditions safer. Maintenance crews don't have to make repairs at the furnace top, where furnace gases and flue dust can make work unsafe and unpleasant. The company's radiation control program insures safe use of radiation sources.

• The company will install nuclear gaging systems on other blast furnaces when they are relined.

Two furnaces were equipped with beam port openings when they were relined recently. They will soon have nuclear gage systems.

Personnel at the Electromechanical Research Center feel that nuclear systems should be installed on all stacks as they are relined. The systems may be used to control automatic stocking; so far, they have been used only as indictors.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Solder Saves $300 Per Dozen on Racks

Low melting point, silver bearing material replaces bolts and nuts; speeds output of plating equipment, adds to its life

SPECIAL SOLDERS that melt at temperatures above that of soft solders but below the high melting levels of brazing filler metals often are the answer to special fastening problems.

North West Plating Co., Seattle, had such a problem. The job plating firm makes its own plating racks. Trouble occurred in joining contact tips to the spline or frame.

A polyvinyl chloride plastic coating is baked onto the rack, but the plating acid soon found crevasses in the coating and attacked the rack at points where the contact tips were bolted.

Leonard Peterson and Joseph Roleau, owners of the plating shop, decided to get rid of bolts and nuts by brazing contact tips to the spline. That created another problem; the heat of brazing annealed the copper contacts so they bent under load.

They tried soldering, using a hard solder with minimum application temperature of 1130° F. The heat also annealed the copper.

A technical representative of Welders Supply Co., Seattle, recommended that the plating firm use a high strength, silver bearing stainless solder and nonacid flux with a working temperature of 430° F.

Called #430, the product is made by All-State Welding Alloys Co., White Plains, N. Y. It has a tensile strength of 28,000 psi. The solder will not melt at 365° F, the temperature at which the polyvinyl coating is baked on, and its melting point is not high enough to cause the copper to anneal.

North West Plating Co. figures it saves $300 in making a dozen plating racks. Soldering eliminates drilling holes in the frame, and the use of bolts, washers, and nuts.

More important, it cuts fabrication time by 80 per cent, reduces weight of the finished product, and produces a longer lasting rack.

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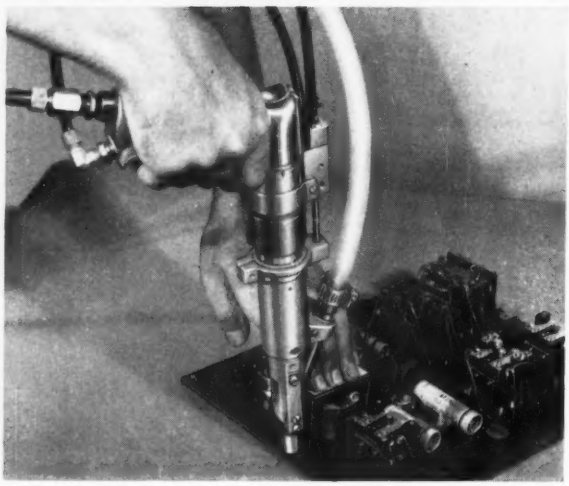

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Fastener faults can quickly foul up the best plans and the finest equipment for high-speed assembly. Defective screws that might "get by" for hand driving can be disastrous to assembly with hopper-feed machines and other power driving equipment.

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You can count on Continental, also, for cost-saving ideas in fastener selection. At your request, a Continental Assembly Specialist will make detailed recommendations.

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Crucible Pioneers in Columbium Sheets

DEVELOPMENT of super materials for missiles and aircraft has been accelerated by the Aeronautical Systems Center of the Air Materiel Command, Wright-Patterson Air Force Base, Ohio.

Crucible Steel Co., Pittsburgh, has a contract with the center's Manufacturing Methods Div. to develop a process for rolling 36 by 96 in. columbium alloy sheets.

• New techniques are needed to make the lightweight, refractory material for aircraft and missiles.

Completion of experimental work, to be done at Crucible plants in Pittsburgh and Midland, Pa., is expected in two years. Objectives: Development of processing techniques and sequences for producing columbium alloy sheets that are highly formable and free of defects. The sheets must have an ultimate tensile strength of 100,000 psi, a yield strength of 80,000 psi, and a flatness of 3 per cent.

• The development program has five phases:

1. Ingots made by sintering and arc casting will be evaluated; casting methods and a system of control and testing will be established; and rolling sequences will be studied. Crucible will recommend the most promising alloy for use at 2000 to 2600° F.

2. The contractor will outline ingot integrity tests. Melting and heat treating characteristics of the ingots will also be studied.

3. This phase will include experimental rolling of 24 by 24 in. sheets, analysis of rolling variables and evaluation of the product and its reproducibility.

4. Sheet size will be boosted to 36 by 36 in., in 0.020, 0.040, and 0.063 in. thicknesses.

5. Crucible will turn out 20 sheets, in the same thicknesses, 36 in. wide and 96 in. long. They will be isotropic, uniform in thickness, and flat, to demonstrate production reproducibility. They will be delivered to aircraft and missile contractors for evaluation, says H. L. Black, Aeronautical Systems Center project engineer.

Electrostatic Spraying Ups Coverage, Downs Cost

Company reports that a gallon of paint covers 160 chair frames compared with 63 by previous method. Parts such as tubular legs can be painted from one side

ELECTROSTATIC PAINTING increased paint mileage about 150 per cent for a maker of steel chairs (Peabody Seating Co. Inc., a division of Modernfold, New Castle Products Inc., North Manchester, Ind.).

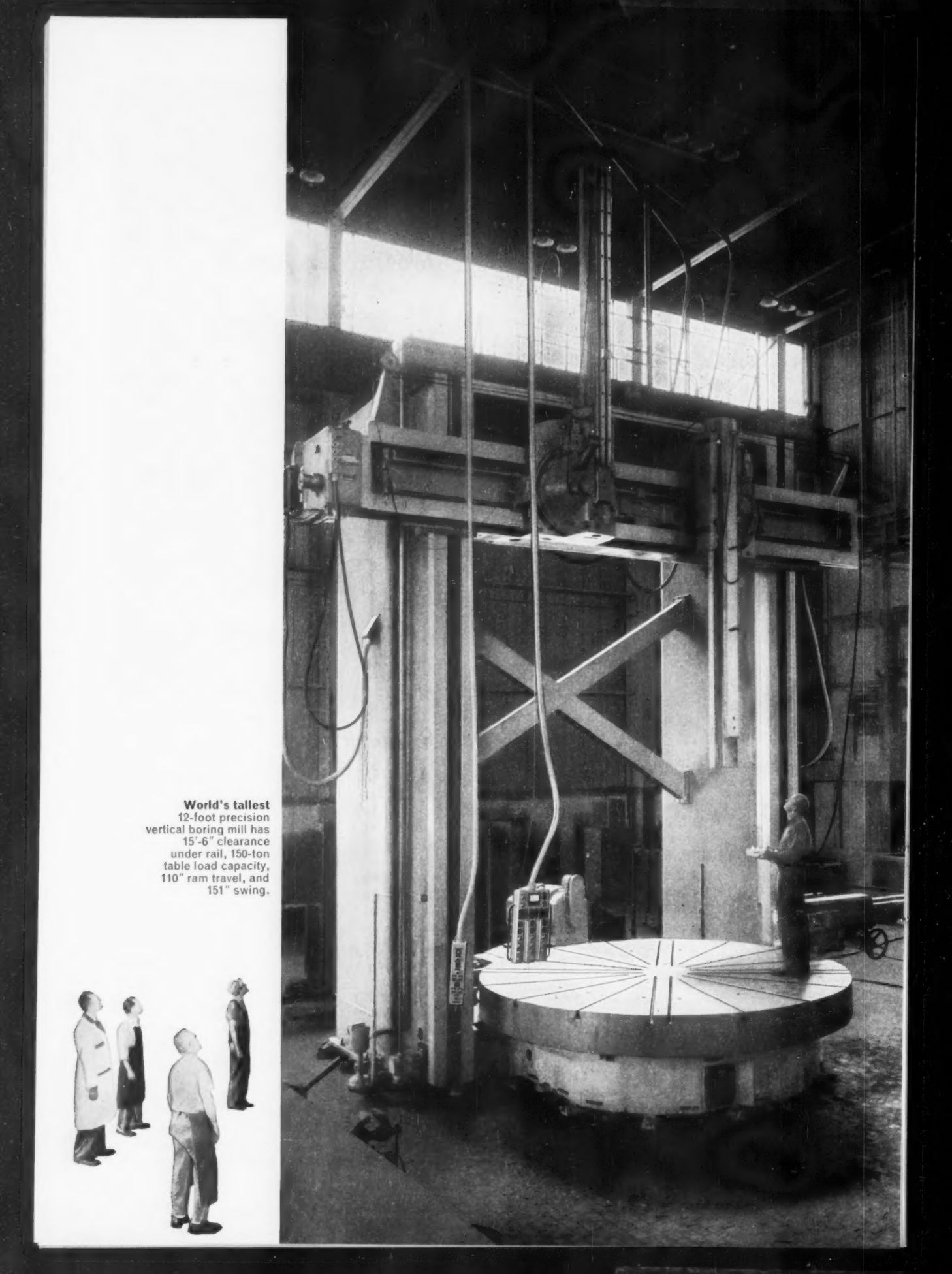
A gallon of paint will cover 160 chairs, says Peabody. The previous method coated only 63 chairs per gallon. Paint loss from dripping and runs is eliminated. Rejects are said to be negligible.

• **Chair Detail**—Student chairs in Peabody's Series 100 line have a two piece, tubular steel frame welded into an integral unit. Legs are swage tapered for additional strength. Basic frame colors are polar gray and dusty blue. Plywood seats and backs are available in natural or colored finishes.

• **Painting**—Metal parts are assembled and painted before the seats and backs are attached. After fabricating, frames are hung on an overhead conveyor and go through a four stage wash. After a 2 minute dryoff, they go into a forced air drying oven and on to finishing.

The overhead conveyor (900 ft long) is operated at 14 ft per minute. Frames are painted with an electrostatic hand gun made by Ransburg Electro-Coating Corp., Indianapolis. Tubular chair construction is ideal for hand gun application because of the wraparound feature of the spray. All surfaces of a leg are uniformly painted from one side.

After spraying, chairs make a triple pass in a gas fired oven, to bake out at 350° F. After a short cooloff, they're inspected and assembled.

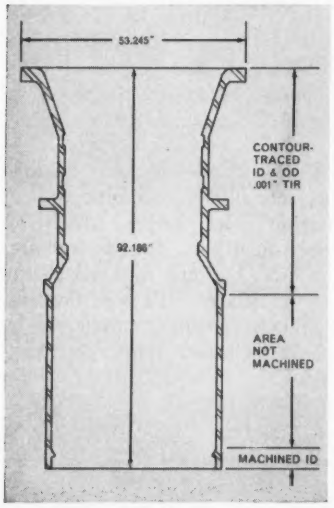


World's tallest
12-foot precision vertical boring mill has 15′-6″ clearance under rail, 150-ton table load capacity, 110″ ram travel, and 151″ swing.

Machining big work to small part accuracies

No piecepart is too heavy or too high to make accuracy a problem on a G&L vertical boring mill.

Precision machining of big atomic reactor vessels at the R. H. Freitag Corporation, division of Alloy Manufacturing Corporation, provides a good example of the capabilities of these machines. Parts are Meehanite castings which are first machined undersize, then clad with 347 stainless and carbide-machined to final size and finish. Diameter tolerances of ± .001″ with .003″ TIR* on contour are required. Freitag is holding .001″ TIR on parts 92″ high and will be able to machine well within the precision required on parts which will require the full 186″ under-the-rail clearance on the machine illustrated.



Accuracy of contour 92″ above table held to .001″ TIR by G&L 12-foot vertical boring mill with electric tracer attachment.

All G&L vertical boring mills are designed to deliver precision accuracies regardless of the size of the workpiece. Antifriction roller bearing table tracks are standard. A preloaded, tapered center roller bearing eliminates table tilt regardless of size or weight of workpiece. A double-walled, heavily ribbed unit bed-and-transmission assures a level, smooth-running table.

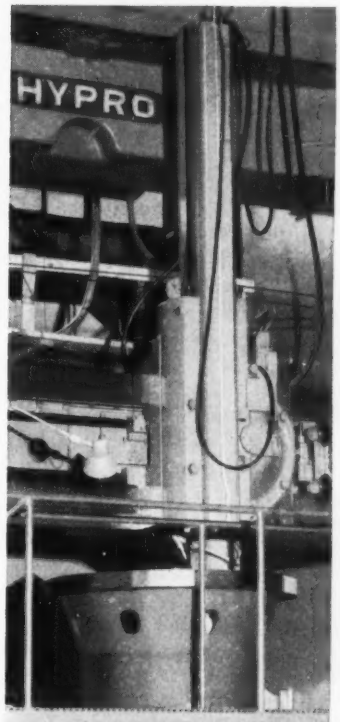
These design features result in low friction, low heat build-up, and uniform heat dissipation so that any size workload can be run *continuously at any speed* without loss of accuracy.

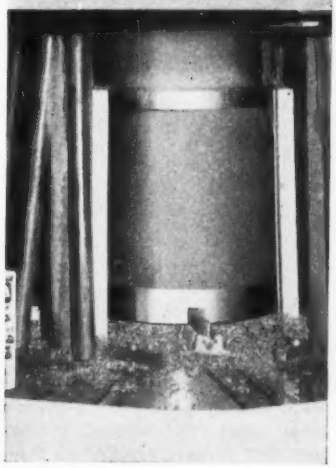
Massive ribbed box-type head, rail, and housing construction match the bed and table design to assure a machine with deflection-free rigidity under the most severe operating conditions.

For complete details on the *high-accuracy, heavy-capacity* boring mills from 54″ to 20′, call your G&L distributor or write to GIDDINGS & LEWIS MACHINE TOOL COMPANY, Fond du Lac, Wisconsin.

*Total indicator runout.

Tracer machining 92″ high atomic energy vessel to accuracies of .001″ at the R. H. Freitag Manufacturing Corporation, division of Alloy Manufacturing Corporation, subsidiary of Salem-Brosius, Inc., Pittsburgh.





GIDDINGS & LEWIS

Giddings & Lewis manufactures: vertical and horizontal boring machines, vertical turret lathes, planers, planer mills, contour milling machines, die sinking machines, drilling machines, numerical and tracer control systems, boring tools and related items, and machine tool accessories.

AIRCRAFT PRODUCTION REPORT:

Castings, Nonmetals, Extrusions Get Boost

Castings are playing critical structural roles in a supersonic jet. Fibers with ceramic binders show promise among nonmetallics. Thinner sections seen possible for extrusions

Castings

TO PUT the performance of a fighter plane into the supersonic T-38 Talon jet trainer, engineers at Norair, a division of Northrop Corp., Hawthorne, Calif., turned to high quality investment castings as prime structural components. Their theory: The castings could save both dollars and pounds.

About 18 cast shapes are used. Many have critical roles with respect to pilot safety and safe performance of the aircraft.

• **Trials and Errors** — Last week, two of Norair's metallurgical engineers, W. R. Roser and K. E. Kuschell, told about some of the troubles they had in getting the castings up to full aircraft capability. Speaking at the National Aeronautical Meeting of the Society of Automotive Engineers Inc., at Los Angeles' Ambassador Hotel, they said: "Castings have not kept pace with the rest of industry, but they are an excellent means of reducing both volume and weight of structures economically."

The alloy used at Norair was 17-4PH, chosen for its good corrosion resistance, high strength, ductility, and castability.

• **Problem 1**—During normal inspection, engineers learned some castings failed to properly respond to heat treatment. The trouble was traced to a pickup of carbon and nitrogen from the carbon arc melting used by one of the foundries.

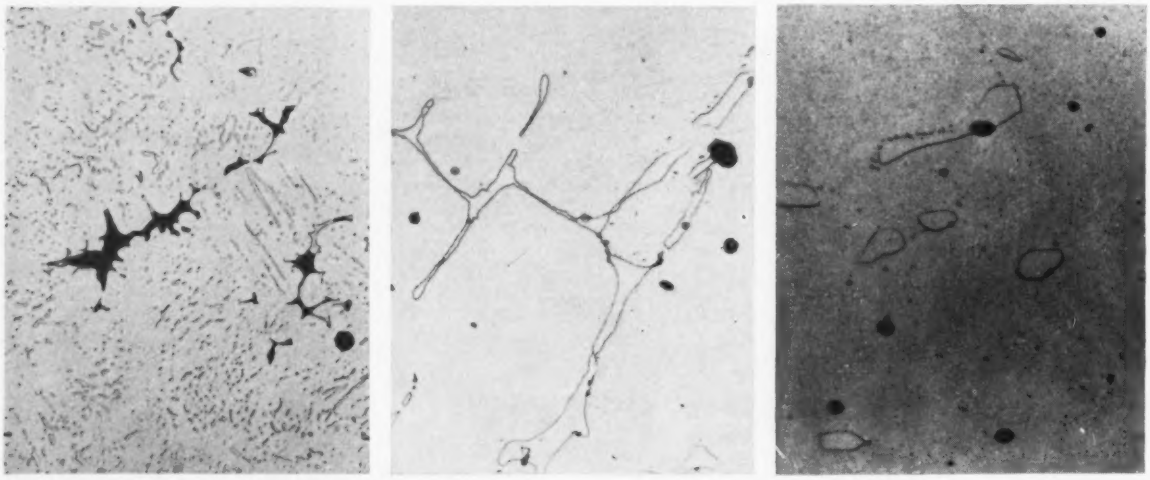
A change to induction melting cured the casting malady.

• **Problem 2**—The heat treat problem created other doubts about casting quality, so thorough tests were started. It was found that about 90 per cent of the parts had ductility far below the required 6 per cent elongation—even though all parts had adequate strength and met chemical specifications.

Microshrinkage proved to be one of the most prevalent causes of poor ductility. It was encountered frequently in test bars from a foundry that used ceramic shell investment molds which were not preheated before pouring. Rapid cooling has been blamed.

Working with the foundries, Norair solved the problem. They also learned that some ductility problems could be attributed to poor gating practices.

• **Problem 3** — The most troublesome condition encountered: A dendritic delta ferrite, which reduced ductility. Brittle fractures were traced along the martensite-ferrite interface. The condition was found in castings produced by ceramic shell and flask type invest-



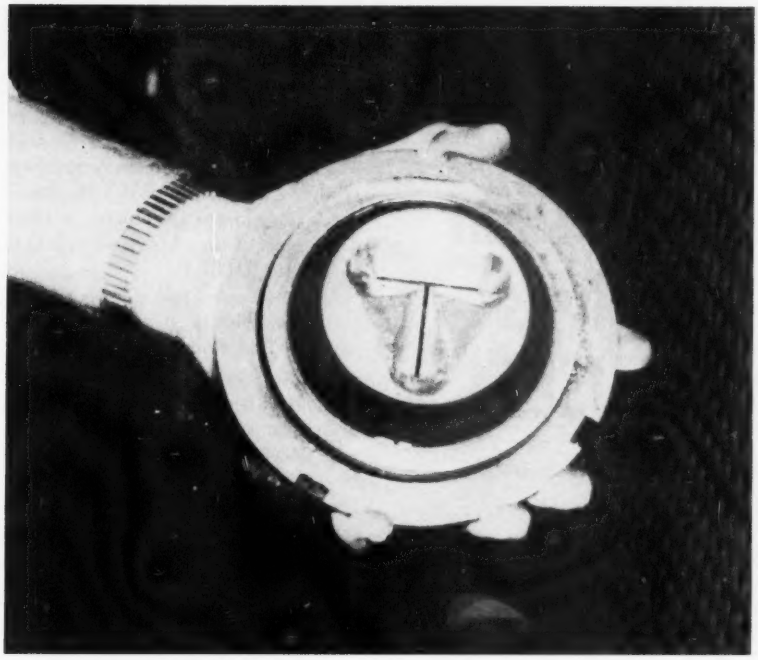
Photographs point up some of the troubles Norair engineers had in getting adequate ductility in their castings. In all cases, the chemical composition was within tolerance, but foundry practice let them down. At left, microshrinkage produced an elongation of less than 1 per cent. At center, the presence of delta ferrite also cut ductility to below 1 per cent elongation. At right, a satisfactory structure has an elongation of 14 per cent

ment methods, but it seemed to be more severe in the ceramic shell cast parts.

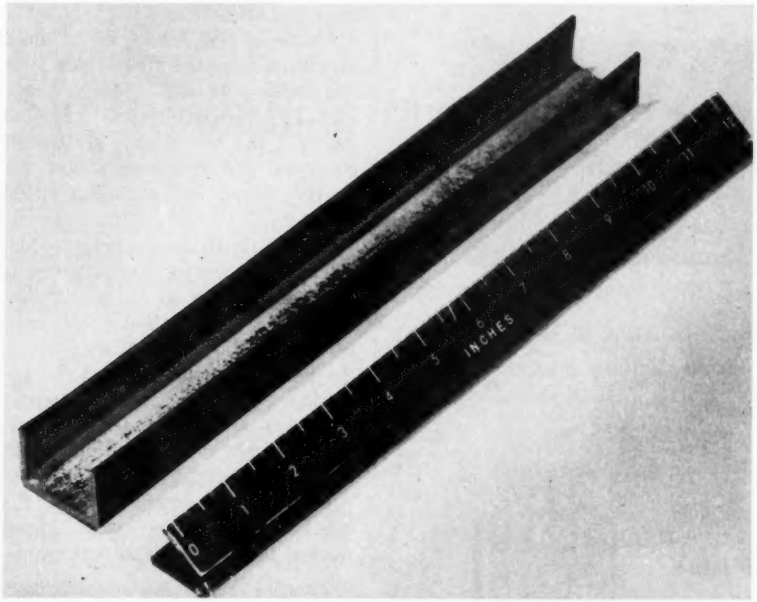
Norair engineers and their casting suppliers drew two conclusions:

First, even though the chemical composition is within the specified ranges, properties of the parts do not necessarily meet the requirements, especially that of ductility.

Second, the cooling rate has a direct influence on the ferrite formed in the casting, and the shape and amount of this ferrite can't be changed by normal heat treatment procedures.



This T-section die, 1.50 in. across with 0.06 in. thick legs, is the test shape for Norair's steel extrusion development project



This is a defectfree section of a bare beryllium extruded channel. So far, glass seems to be the best lubricant for the job

• **Recommendations**—As a result of their successful bid to qualify 17-4PH castings for aircraft jobs, Norair engineers gained this knowhow:

1. Even though heat treatment won't reshape the ferrite, the parts are homogenized at 2100° F to get rid of segregation.

2. Two integral bars should be cast with each part. (They are used in destructive tests.) Further, one casting from each of the first three lots is tested destructively to establish a correlation between the parts and the test bars.

3. Since 17-4PH is a "sensitive alloy," extremely close control over the chemistry and foundry practice is required. Norair engineers now specify remelted bar stock for the melt. Shotted material was found to have inadequate chemistry control for the aircraft jobs.

Watch Nonmetals

Increasingly critical requirements for high temperature applications in both manned and unmanned aircraft may be met by nonmetallics.

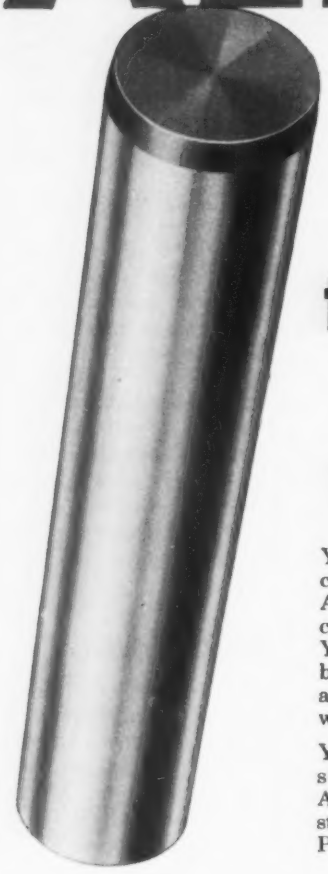
That's a conclusion of M. B. Dunn, M. D. Musgrove, and O. T. Ritchie, Boeing Airplane Co., Seattle. The Boeing spokesmen pointed out at the SAE meeting that many nonmetallics can satisfy several of the design needs, while remaining competitive on a weight basis. They also were cited as being simpler to work with than metallic materials in terms of design and fabrication.

A material the Boeing engineers feel may be a comer: Composites generated from fibers and ceramic binder. One example, Fibrefrax, consists of aluminum silicate fibers, bonded with a colloidal silica binder. The material can be formed with a wide variation of densities.

These materials are practically immune to high temperatures, but they have low strength. A group of problems, like surface abrasion and joining methods, remain to be solved. Still, the material may well be an integral part of tomorrow's hot aircraft.

(*Please turn to Page* 132)

ALLEN

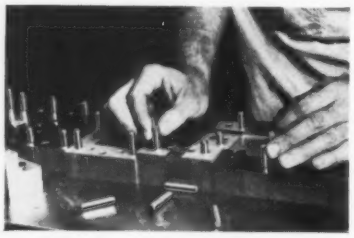


ALLEN is the dowel pin that gives you PLUSES!

Your ALLEN Industrial Distributor can show you a good many ways to use ALLEN Dowel Pins, in addition to conventional uses in tool and die work. You can use them as economical roller bearings, axles, precision plugs, hinge and wrist pins—and in many other ways.

You can cut the cost of your product substantially, too—because your ALLEN Distributor can supply these strong, accurate, mirror-finished Dowel Pins in standard sizes right from stock.

Made of special Allenoy steel; surface hardened to 62-64 Rockwell C; precision ground to .0001" with micro-inch finish of 6 RMS max. Check your Allen Handbook or Catalog for detailed specs and standard sizes, or write direct for samples and technical information.



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ALLEN HEX-SOCKET SCREWS HEAD

Advances in Extrusion

Steel alloys A-286 and H-11 can be extruded to 0.062 in., some 25 per cent thinner than many authorities have considered to be the theoretical minimums.

The conclusion is based on a research project at Norair Div., Northrop Corp., Hawthorne, Calif. Lyle M. Christensen, design specialist, told the SAE conference that the thinner sections are necessary to cash in on future aircraft jobs with extrusions.

The project has not been completed, but extrusions of 0.093 in. thickness have been produced. They were made from A-286 with billets heated to 2100° F.

En route to high quality, ultrathin extrusions, Mr. Christensen says several things were learned:

- Inadequacy of lubrication practices has been proved. Both the billet and die must be well lubricated. New type glass lubricants will be compacted into contoured discs for the die. Nickel plating is being studied as a billet lubricant.
- New die designs are needed to improve flow characteristics.
- A good heat shield is needed to prevent radiation and convection losses, so the billet can be put into the die at optimum temperature.

Within two years, aircraft quality beryllium extrusions should be commercially available, Mr. Christensen predicts.

He feels the feasibility of bare beryllium extrusions has been "undisputably proved." Major problems are concerned with lubricants (glass is the best tried), die design concepts, and the temperature, reduction ratio, and extrusion speed variables.

One trick that can help: Mr. Christensen reports that extrusion is sometimes easier if a readily extrudable material (like a soft copper-nickel alloy) is put in front of the beryllium billet to start the operation. He says this apparently creates a streamline flow pattern that helps the beryllium pass through the die.

Of the die materials tried, the cobalt-chrome alloy steels have worked best for repeated extrusions.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Turret Drilling Unit Speeds Small Part Machining

YOU can speed up drilling of small parts with the Model IC six spindle turret drilling machine. The turret principle increases its range of application.

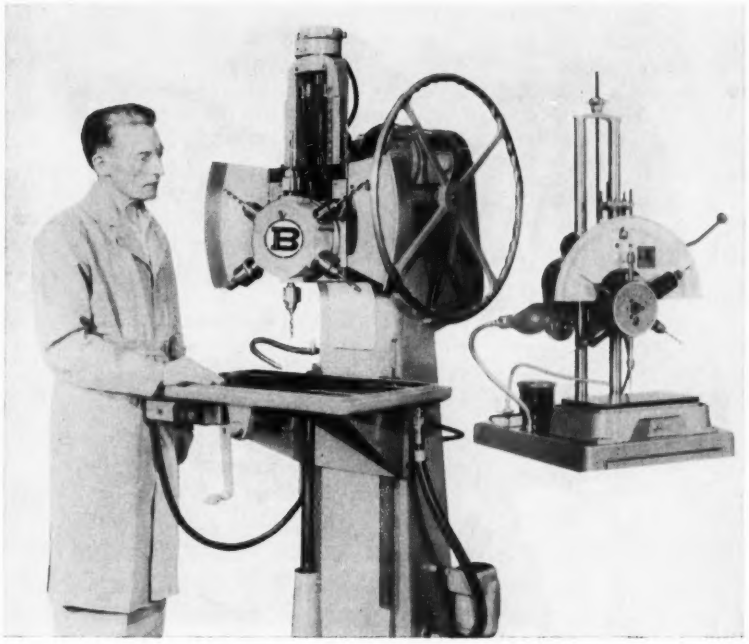
Machining typical to line operations can be performed at one position, says the company. Fixture shuffling, floor space requirements, and operator movements are reduced.

Power indexing turrets permit a sequence of operations to be carried out in a minimum of time. The machine is rated to drill holes up to ½ in. in diameter in cast iron.

Spindle speeds and depth control are preselective and are automatically shifted as the spindle indexes.

Applications include precision sensitive drilling of small parts in the aircraft, missile, and electronic fields.

For further information, *write* Burgmaster Corp., Gardena, Calif.

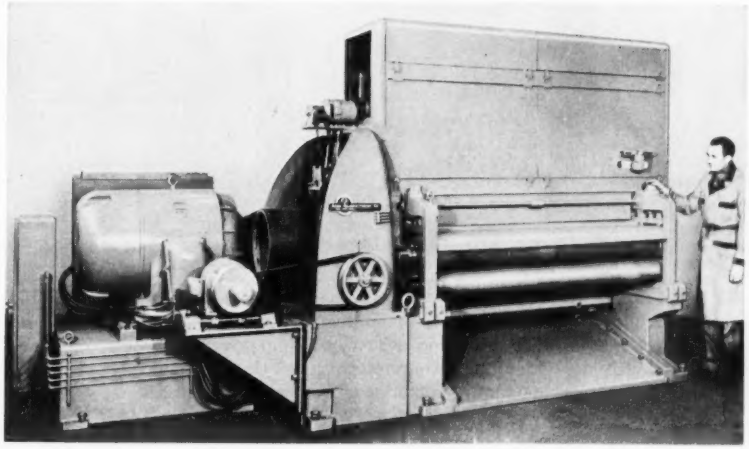


Sheet Polishing Mills Handle Feeds Up to 60 fpm

ABRASIVE belt finishing operations can be performed on metal sheets up to 74 in. wide with the 150 hp Acme polishing mill shown here. The unit occupies about 5½ x 16½ ft of floor space and is about 9 ft high. Center to center distance between units lined in tandem (for a continuous finishing operation) is 6 ft.

Other typical standardized units are made to handle stock widths of 30, 40, or 54 in. The units can handle sheets and plates from 3 ft in length to coils at feeds from 20 to 60 fpm.

Material to be finished is tra-



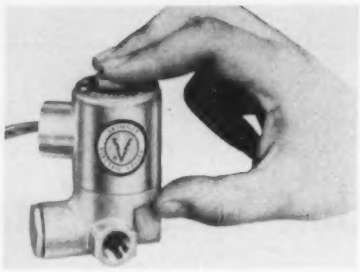
versed through the mill between the contact and billy roll by individual assemblies of four pinch rolls. The pinch rolls are driven in either direction by a separate motor through worm gears and flexible couplings. The billy roll provides the work pressure. Air or hydraulic cylinders provide pressure adjustments. Controls for the mill functions are in a panel at the end of the machine.

For further information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Solenoid Valves Are Rated for High Pressure

HIGH pressure Skinner solenoid valves are pilot operated types with two way, normally closed construction. You have a choice of voltages and frequencies.

Media such as air, oil, or water



can be handled. Orifice size is ¼ in. with ¼ in. ports. Operating pressure differentials are 5 to 1250 psi on ac voltages and 5 to 1000 psi on dc voltages. Higher than standard pressure ratings are obtainable for specific applications.

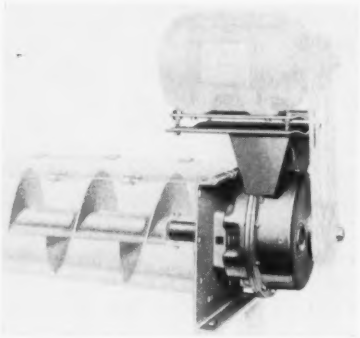
Underwriters' Laboratory requirements are met in both standard and explosionproof construction, says the company. Bodies are forged naval brass and all internal parts are stainless steel. A spring loaded plunger and piston assembly provide positive closing and permit mounting in any position.

For further information, *write* Dept. PR196, Skinner Electric Valve Div., Skinner Chuck Co., 105 Edgewood Ave., New Britain, Conn.

THIS UNDERDRIVE LINK PRESS has two movable bolsters. One can be available for die changing while the other is in production. Other die changing features include an electronic slide adjusting system which automatically sets die space to within 0.001 in., and Bliss electropneumatic die clamps. The press is being installed by a major automotive manufacturer to establish procedures for rapid changing of dies. For more information, **write** E. W. Bliss Co., 1375 Raff Rd. S. W., Canton 10, Ohio

Screw Conveyor Drive Comes in Six Sizes

A COMPACT helical gear drive is offered in six sizes for screw conveyors requiring ½ to 30 hp. Each size has ratios of 4:1, 9:1, 14:1, and 24:1. You can get various drive assemblies from stock. The basic drive (reducer, driveshaft, and seal housing) can be combined with standard trough ends and with the Falk motor mount.



Driveshafts are removable (in many cases without disturbing reducer or screw). Tapered roller bearings absorb thrust from the screw conveyor, eliminating the need for thrust bearings on the trough end.

Eight sizes of trough ends (from 6 to 20 in.) bolt to standard troughs. Predrilled motor mounts are available for NEMA foot mounted motors (within rated capacity of the reducer).

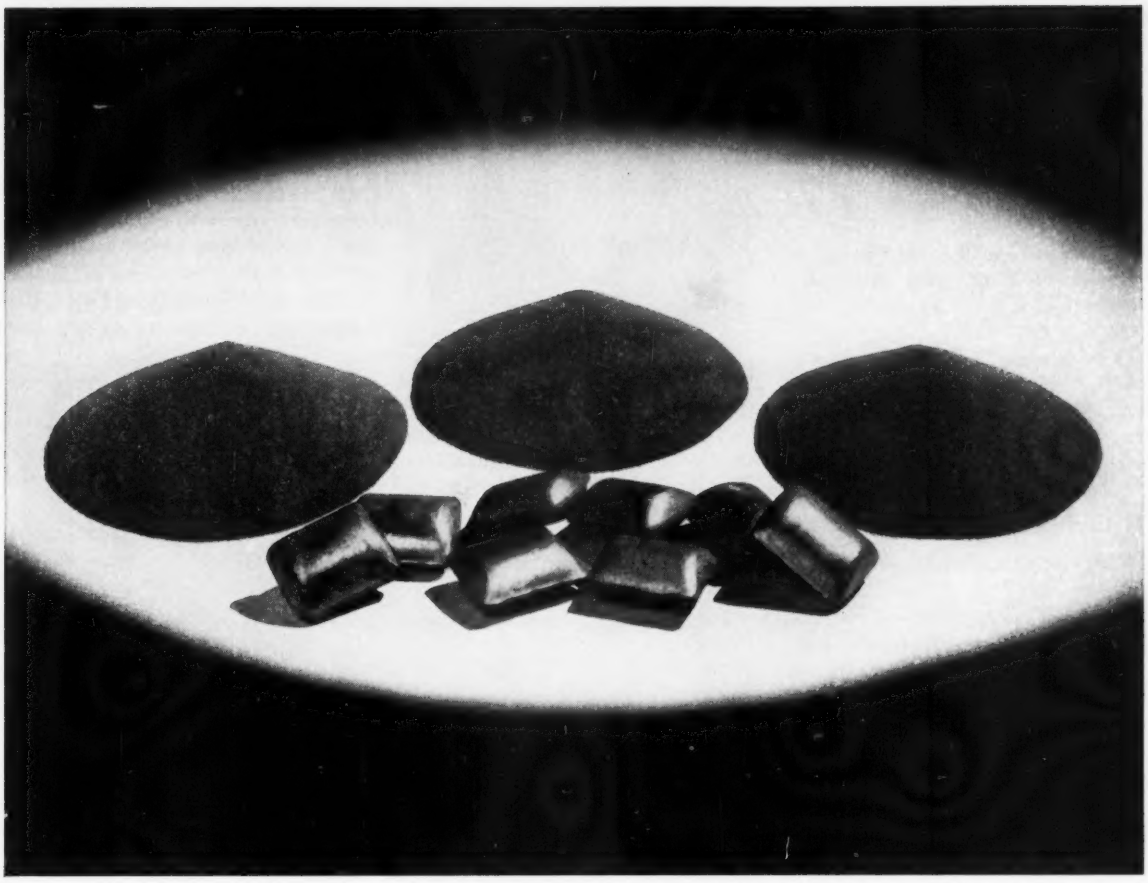
For further information, *write* Dept. 255, Falk Corp., Box 492, Milwaukee 1, Wis.

Machine Marks Pipe But Doesn't Distort

A SEPARATE impact system is provided for each stamp in the Model 1600 pneumatic marking machine, holding the required force to a minimum and permitting marking of pipe, tubes, and couplings without distortion. Impression depth is controlled at each impact cylinder.

Stamps are retained in a rubber holder to prevent breakage if the machine is operated without pipe. The unit can be built for stamping any number of letters or figures. Stamps can be changed quickly.

Operation: A master cylinder low-



Sherritt High-Purity Nickel is available in handy briquettes (1¼" x 1½" x ⅝") and in three grades of powder—Grade C (coarse), Grade F (fine), and Grade S (medium).

nickel as you like it

Nickel as you like it . . . *in purity, in handling ease, and in alloying efficiencies.* Sherritt's unique hydrometallurgical refining process yields nickel powders with a guaranteed purity of better than 99.8%. Available in briquettes and in three grades of powder, Sherritt nickel takes all prizes for handling ease. There are no strips to cut, no unwieldy plates to handle. Alloying is quicker and less troublesome. By disintegrating into smaller agglomerates, Sherritt powders and briquettes go into solution more rapidly with less chilling. This low-chilling property permits alloying additions even at the end of the heat. Sherritt also offers special grades and coated powders.

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 411S Eighteen West Chelten Building, Philadelphia 44, Pa.

SHERRITT GORDON MINES LIMITED

ers the machine on the pipe and individual impact cylinders are set off. After marking, individual cylinders return to up position and the master cylinder raises the unit off the pipe.

You can use the marker as a separate unit or with automatic stenciling, length measuring, or weighing equipment.

For further information, *write* M. E. Cunningham Co., 1025 Chateau St., Pittsburgh 33, Pa.

Wide Range Comparator Tilts for Accurate Reading

MORE accurate reading with no parallax error is claimed for the Model B-2 comparator. The instrument has a cast aluminum base with an angle support that may be

folded out to tilt the whole unit 20 degrees upward.

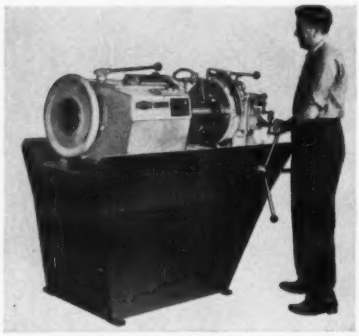
The large frame provides greater rigidity and measuring capacities. The unit is best suited for on the spot checking in the shop or laboratory, says the maker, but it can also be mounted on a bench for standard production line inspection.

For further information, *write* Petz-Emery Inc., Pleasant Valley, N. Y.

Pipe Machine Does Close, Precision Threading

CLOSE, precision threading is claimed for the Oster 4 in. pipe machine equipped with tangential type die heads and chasers. The machine is a floor type with a standard range of 1 to 4 in. and an extra range for ½ and ¾ in. pipe.

The second head (used for smaller diameters) is mounted on the face

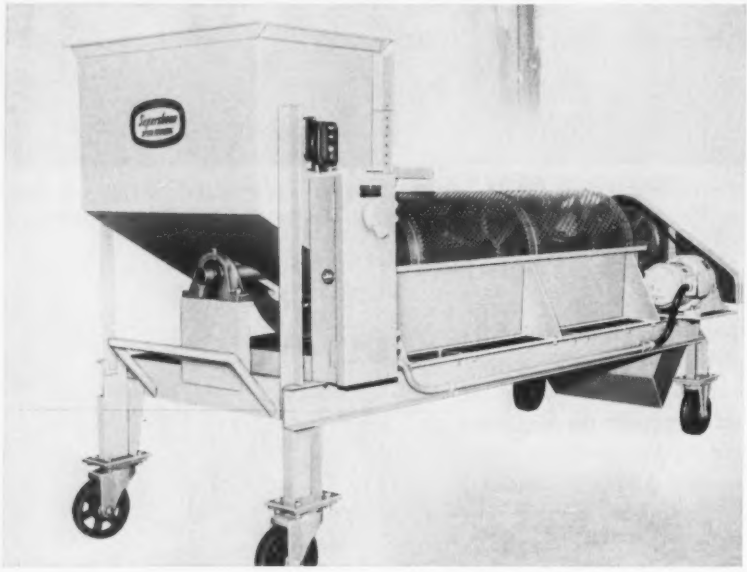


of the large head, which eliminates constant die head changing.

The front chuck is ideal for frequent changes of pipe sizes because a spin of the handwheel quickly moves the gripping jaws through the entire range. The rear centering chuck is quick acting and nonbinding.

On long pipe, the rear chuck and the extra long spindle prevent whipping and assure straight threads. Four spindle speeds are controlled by levers within easy reach of the operator.

For more information, *write* Oster Mfg. Co., 1340 E. 289th St., Wickliffe, Ohio.



Media Classifier Cuts Finishing Cost

THREE grades of media can be resized automatically at rates up to 6000 lb an hour with the Almco media classifier. Media can be reused indefinitely.

Accurate sizing reduces the possibility of media lodging in blind holes of parts being barrel finished.

Hoist pans under each screen collect each classification. A large bin at the end of the classifier stores oversize material. Interchangeable screens are available for classifying a complete range of sizes. The hopper has an adjustable metering chute for controlling flow into the classifier drum.

A four-screen classifier is also available.

For more information, *write* Almco-Queen Products Div., King-Seeley Corp., Albert Lea, Minn.

Turnover Cradle for Coils Simplifies Palletizing

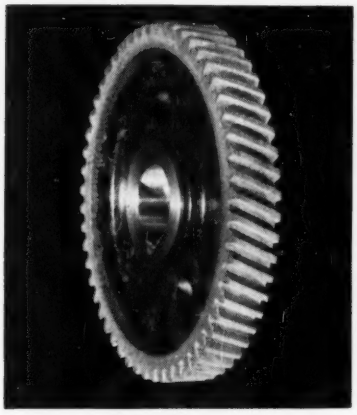
SIMPLER palletizing of coils and elimination of egg shaping or band breaking are among the advantages cited for the La Deau turnover cradle.

The unit is designed to automatically rotate and palletize rolls of coiled material. Capacity is 20,000 lb. The coils are placed vertically on the cradle with a lift truck against the pallet. In one operation, the cradle rotates 180 degrees horizontally and 90 degrees vertically. The motion palletizes the coil

PROGRESS IN PLASTICS

CDF CELORON GEARS ARE QUIET, WEAR LONGER

Why plastics for gears? Because laminated-rim molded Celoron® gears are *quiet* (eliminate the annoying noise of chain timing and metal-to-metal gearing). Because they reduce heat and wear on mating metal gears, thereby reducing repair costs and preserving accuracy throughout the life of the engine.



Strength. Stamina is built into every CDF Celoron gear. Stronger teeth, longer running life, and smoother performance are characteristics of the Celoron gear. No type of "cheaper" gear construction has yet proved as satisfactory.

What it is. Each CDF Celoron gear blank is molded of laminated and macerated cotton cloth impregnated with a special phenolic resin. Gear teeth are cut in the laminated rim. Repeated tests prove the high impact strength, the great wear-resistance, and the low tone frequency of this "silent" gear material.

Design and purchasing men interested in adapting Celoron gears for engine-timing and other needs may obtain full technical data (properties, horsepower ratings, etc.) by writing to the Celoron Division of CDF at Bridgeport, Pennsylvania.

COMPLICATED PLASTICS PARTS AT LOW COST THROUGH POSTFORMING CDF DILECTO

How it's done. Briefly, postforming is effected by heating a special grade of CDF Dilecto® laminated plastics until it's pliable, and then forming it in an unheated, inexpensive mold.

Less expensive. When you postform Dilecto parts, you generally save money all around: Lower die costs (often wood or plastics is entirely satisfactory); lower retooling costs to meet new specifications; lower labor costs—these are a few of the savings made possible through postforming of Dilecto.

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Dilecto tubing on automatic screw machines, by men who know best how to cut costs in working laminated plastics. Investigate CDF's extensive fabricating facilities—let CDF do the whole job, and assure your own production deadlines.

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Please send the following Technical Bulletin(s):

☐ Celoron Molded Gears, Bulletin C-58

☐ Dilecto Postforming Grades, Bulletins 11,110 and 11,140

☐ Please have a CDF representative call to discuss my electrical-insulation problems in detail.

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Company_____

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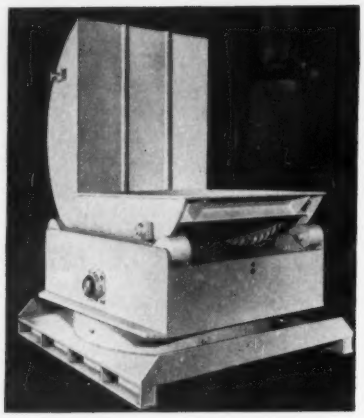

and rotates it to face the fork lift truck for removal. The operation takes less than 20 seconds.

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For more information, *write* La Deau Mfg. Co., 2702 San Fernando Rd., Los Angeles 65, Calif.

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HERE is a honing machine designed for production runs, toolroom work, and salvage operations.

Spindle speeds are infinitely variable from 225 to 525 rpm or from 450 to 1050 rpm on an optional range. The unit (Model J2) is powered by a ½ hp, 110 volt, 60 cycle, single phase motor. The

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Optional equipment includes a dial indicator, full width extension tray, and a filter tray with three settling baffles and burlap filter.

For more information, *write* Superior Hone Corp., 1620 Elreno St., Elkhart, Ind.

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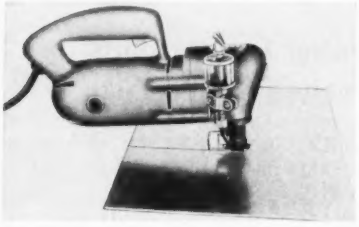

You can select from two models of the lubricator for Nibblers now on the market.

For further information, *write* Modern Mfg. Co. Inc., 680 Davisville Rd., Willow Grove, Pa.

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ACID TANK HOODS, plating baths, and other equipment can be protected with Coro-gard 1706 Brand protective coating. The neoprene based coating has high adhesion to such materials as unprimed steel, aluminum, copper, and galvanized steel.

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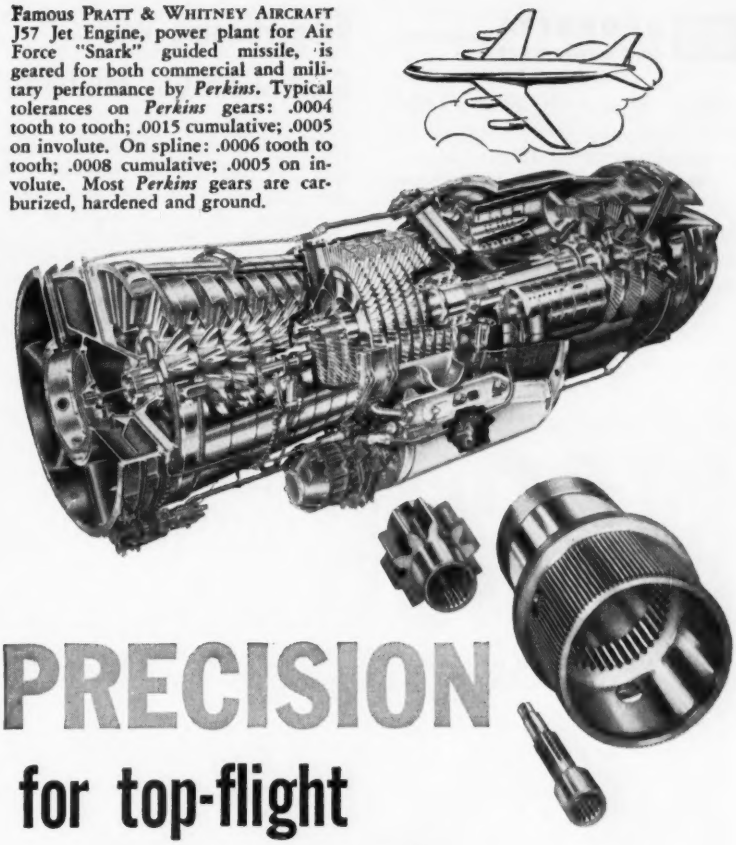

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For further information, *write* Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

Proportioning Valves Control Air-Gas Mixture

ECONOMICAL controlling of air and gas mixtures is possible with the new line of Varitrol proportioning valves. Five sizes are available.

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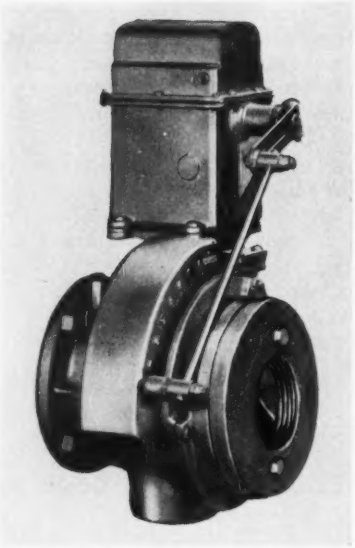

For more information, *write* Eclipse Fuel Engineering Co., Rockford, Ill.

Power Control Units Feature Smaller Size

YOU CAN GET size reduction benefits from the Magnetic Amplifier line of power control units. They're about two-thirds smaller, and weigh four-fifths less than present apparatus doing the same job, says the maker. The design can withstand severe vibration, shock, and temperature extremes.

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For more information, *write* Magnetic Amplifiers Inc., 632 Tinton Ave., New York 55, N. Y.

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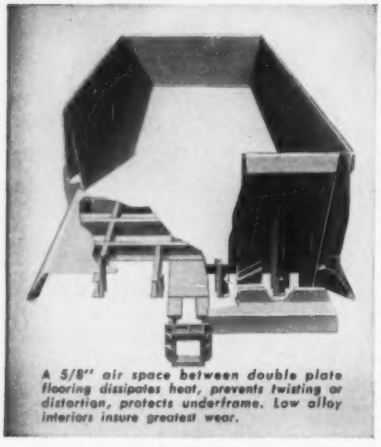

A 5/8" air space between double plate flooring dissipates heat, prevents twisting or distortion, protects underframe. Low alloy interiors insure greatest wear.

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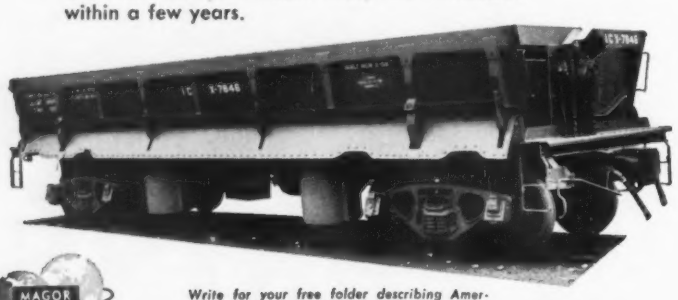

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Thermocouple Data

Catalog EN-S2 offers information about a full line of thermocouples and thermocouple components and accessories. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Guide for Tube Users

"Revere Aluminum Tube," 48 pages, contains information on the selection of proper tube alloys, temper designations for aluminum tube, and resistance of alloys to various chemicals. Advertising Dept., Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.

Platinum Products Catalog

A 20 page catalog describes this company's line of platinum products and includes data on clads and composites of platinum group metals with base metals. Platinum Works, J. Bishop & Co., Malvern, Pa.

Grinding Wheel Tips

Over 1600 abrasive wheel recommendations for grinding nearly every material are set up in alphabetical order in this 57 page catalog. Advertising Branch, Carborundum Co., Niagara Falls, N. Y.

Polycarbonate Mill Shapes

Bulletin BR-12 contains descriptions and applications for polycarbonate rods, plates, discs, and tubing which are machinable on standard metalworking equipment. Polymer Corp. of Pennsylvania, Reading, Pa.

Flexible Coupling Data

An expanded line of Dodge Para-Flex flexible cushion couplings for motors ranging from fractional to 190 hp per 100 rpm is described in Bulletin A669C. Dodge Mfg. Corp., Mishawaka, Ind.

NEW BOOKS

Zinc, the Science and Technology of the Metal, Its Alloys and Compounds, edited by C. H. Mathewson with the cooperation of the American Zinc Institute. Dept. 156, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 700 pages, $19.50

This monograph on the metallurgy, chemistry, extraction, and uses of zinc is the most complete book ever published on the subject, says the publisher. Forty-five specialists blanket the field from geology through the end product. The book's 14 chapters cover such topics as economics, geology, ore treatment, refining, processing, alloy technology, the use of zinc for extraction of other metals, zinc compounds, the biological significance of zinc, and its use in agriculture.

An Evaluation of the Present Understanding of Metal Cutting, American Society of Tool Engineers' Research Fund, 10700 Puritan Ave., Detroit 38, Mich. 275 pages, $5 to members of ASTE, $7.50 to nonmembers

This research report represents the first attempt to evaluate, analyze, and condense the lessons contained in the world's metal cutting literature. The authors believe that present knowledge provides a reasonably detailed picture of the metal cutting process as a sound basis for further studies leading to better materials and more economical cutting practices. The emphasis in this report is on why particular metal cutting practices work.

Scientific Management of Marketing Operations, Al N. Seares, Research Division, Society for Advancement of Management, 74 Fifth Ave., New York 11, N. Y. 36 pages, $1.50

The modern marketing concept (a change in emphasis from selling what is made to making what will sell) requires greatly improved skills of market analysis and creativity on the one hand, and company-wide application of the most profitable use of scientific management on the other. The author of this booklet charts the most advanced thinking and practices for combining modern marketing with profitable scientific management throughout the organization.

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Acme-Newport mills; Cincinnati in background

October 12, 1959

Steel Squeeze, Cutbacks to Continue

STEEL SUPPLIES are so close to exhaustion that nearly all consumers face drastic production cutbacks, layoffs, or shutdowns in a matter of days. Within two weeks, even the largest and best protected users will feel the strike's impact. Worse yet, there is nothing—not even an immediate settlement—that can prevent the situation from deteriorating before it improves.

In the first two weeks after the strike, inventories will continue to drop as shipments fall short of consumption. By the third week, mills may start shipping as much steel as customers are using up, but hardships will continue. It will be the fourth week, at best, before an inventory buildup begins.

STOCKS AT ROCK BOTTOM— When the strike started, finished steel inventories were between 24.5 million and 27 million tons—probably at an all-time high. Since July 15, they've been pulled down at an average rate of 1.1 million tons a week. Today, they're close to 11.5 million.

At the depth of the 1957-58 recession, 11.5 million tons was an adequate inventory. It would sustain operations for 60 days at consumption rates then prevailing. Today, it's far from sufficient. Market analysts believe 22 million tons would be about right for current conditions. They're frankly amazed that users haven't had more serious problems than they've experienced thus far. The only explanation seems to be that inventories were extraordinarily well balanced when the strike began.

BOTTLENECKS FEARED—Because of the strike's length, steelmakers are much concerned about the possibility of extensive damage to furnaces and other equipment. Repair problems could be unusually severe in the startup period because operations were so high and maintenance was so perfunctory during the first half. After the 55 day strike in 1952, the national ingot rate jumped from 15 per cent to 89 in two weeks. Steelmakers are hoping to do as well this time, but the task will certainly be more formidable (weekly capacity was then 2 million tons, now it's 2.8 million).

SLOWDOWNS THREATENED— To get high production, steelmakers will need full co-operation from employees. When President Truman held off a strike in 1952 by seizing the industry, worker performance was none too good. Case in point, one month's output from a 79 in. mill rated at 89,000 tons capacity was only 35,000. "We couldn't see the slowdown," a sales executive comments. "The men all seemed to be working, but we weren't getting enough production. We had a 100 per cent payroll and a 40 per cent output."

AUTOMAKERS ALARMED— Automakers aren't missing any bets in their efforts to get badly needed steel for 1960 model runs. Instead of selling the scrap they've been generating, they're shipping it to converters. At Chicago, a General Motors division offered brokers 93 carloads but delivered only nine. At Detroit, Chrysler withdrew scrap from a monthend list for the same reason. Shortages of wire products and bars threaten automakers and their suppliers. Prestrike purchases weren't big enough.

PRODUCTION STEADY— Last week, steelmaking operations continued at 13 per cent of capacity. Production was about 368,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

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*Current prices were published in the Oct. 5 issue and will appear in subsequent issues.

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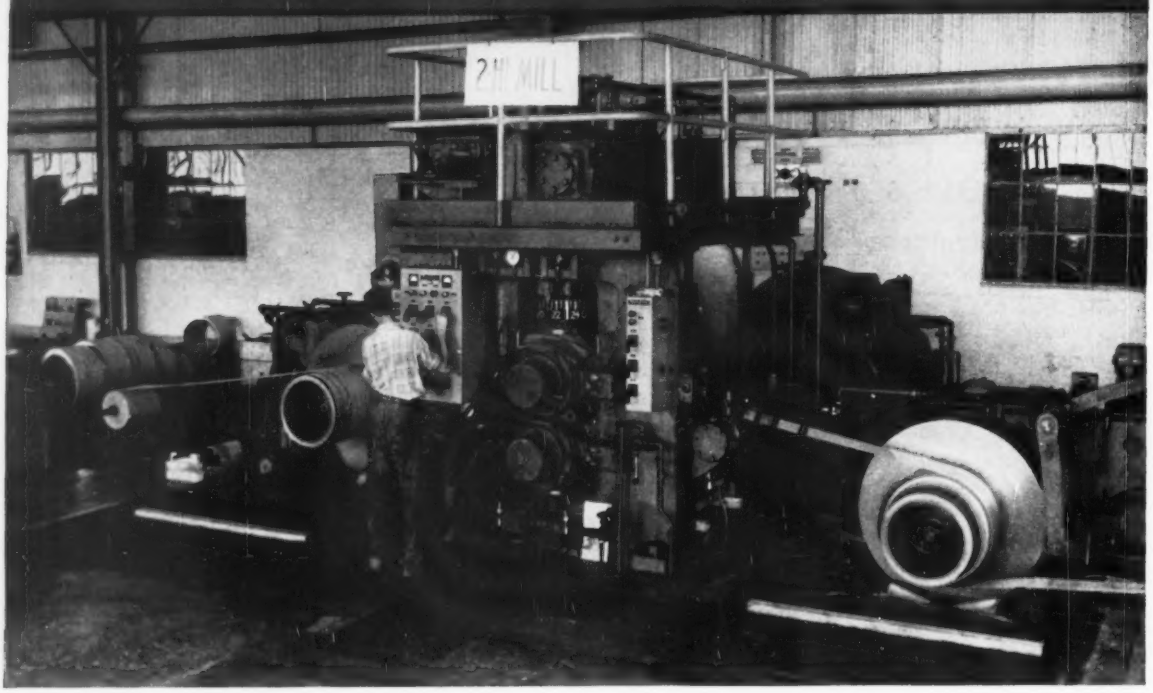
TREADWELL TEMPERING MILLS

(complete with coiling equipment)

Commended for performance by Atlas Steels *



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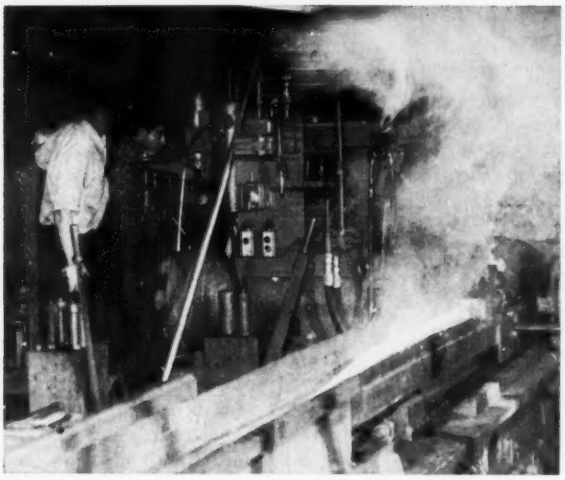
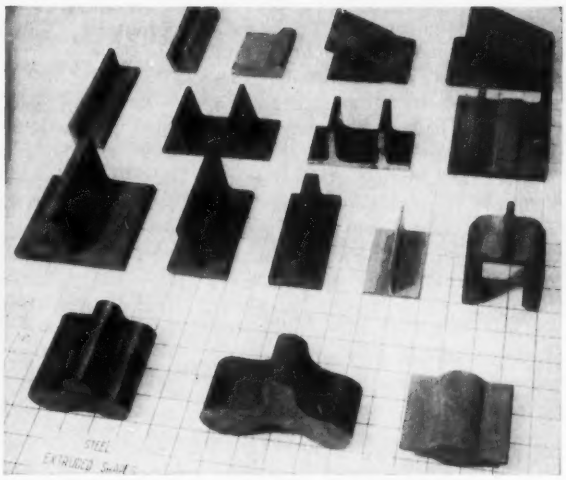


Harvey Aluminum Inc. is a steel extruder . . .



producing custom configurations like these

Steel Extruders Hunt New Markets

U. S. STEEL EXTRUDERS are looking for a mild recovery from a double-barreled recession last year.

On top of general bad business, the ferrous extruders saw their major market practically fold up as government defense spending shifted from aircraft to missiles. Steel extrusions (they have been on the market only about seven years) gained quick acceptance in jet aircraft.

• Producers are relying on aggressive marketing to develop new commercial markets.

Carbon and alloy extrusions are produced by Allegheny Ludlum Steel Corp., Watervliet, N. Y.; Babcock & Wilcox Co., Beaver Falls, Pa.; Canton Drop Forging & Mfg. Co., Canton, Ohio; Curtiss-Wright Corp., Buffalo; H. M. Harper Co., Morton Grove, Ill.; Harvey Aluminum Inc., Torrance, Calif.; and National Tube Div. (Gary, Ind.) of U. S. Steel Corp. Jones & Laughlin Steel Corp., Pittsburgh, temporarily withdrew from the business over a year ago.

No industry statistics have been compiled, but it is estimated that 1959 sales will run close to $2 million (solid extrusions only, excluding tubing). That represents a 50 per cent gain over the 1958 figure. Several companies report sales showed steady growth last year. Peak years were 1956 and 1957.

Carbon steels commonly extruded are the AISI series, C 1010 through C 1050. Alloy steels include AISI 4130, 4140, 4330, and 4340. Stainless steels embrace AISI Types 302, 303, 310, 321, 410 and the precipitation hardening group. Tool steels of the H-11 type are also extruded.

• Configurations are widely diversified. They can be any open-end nontubular shape.

Steel extrusions for aircraft are used in the airframe as structural members, frames, rods and engine mounts, and in supports for jet engines. They also are used as structural members in missiles. New applications are being found in the architectural, automotive, textile, agricultural, construction, dairy and food handling, tool and die, and material handling fields.

The aircraft industry is still the biggest buyer of steel extrusions. Its chief requirement: Jet engine rings. They are produced by rolling extruded sections into circles and butt-welding the ends. One of the most promising applications is in architecture. The problem: Thinner cross sections than those now available.

• Extrusions are competing with products made by other methods of fabrication, including those which are hogged out of solid metal, and specially rolled shapes.

Some extruders say improved manufacturing techniques and lower production costs make it possible for them to sell shapes in markets where the tonnage requirements will not justify the cost of rolls or machining setups. In certain areas, they are also able to compete with hot rolled carbon steel bars sold to cold drawers. They believe the market could develop into a substantial one.

Some extruders regard 500 lb as a minimum workable quantity. It is possible to extrude, stretch, straighten, and otherwise process sections up to 40 ft long.

The chief technological changes involve improvements in die design and die materials and temperature control. More automation is in prospect. Work is also going into perfecting techniques for extruding high temperature and other ferrous alloys.

Molten glass continues to be the chief lubricant, but other types are

being investigated. In the Ugine-Sejournet process, heated billets roll down a runway covered with glass particles and are rammed against a spun glass pad as they enter the extruding die.

Since the production of ferrous extrusions is largely a custom business, price competition is not a serious problem. Generally, the extruder's quotation is the cost plus markup.

A few extruders publish price lists covering standard configurations, but even so, prices have been relatively stable.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 156 & 157

Assuming early resumption of steel production, most sheetmakers have enough in-process and other orders acknowledged prior to the strike to keep them busy over the rest of this year. Most of the orders placed since the strike started are not likely to be handled before first quarter, and in some cases even beyond.

Practically all inquiries now are labeled "urgent." No longer is it a case of consumers trying to maintain inventories. Now it's a matter of getting enough steel to keep operations going. Cutbacks are numerous, with some consumers fearing they will have to suspend entirely before any improvement appears in supplies.

Conversion deals are increasing. In fact, they have about reached their potential limits. Substitution of grades and sizes for those in scarce supply is common.

Mills not strikebound are receiving inquiries from regular customers which are "out of pattern." Many consumers normally buy from more than one source, and as some sources have dried up, they are trying to obtain more tonnage from those mills still operating. The pressure extends to specialties as well as to the major tonnage items. The supply of strip plate, it's said, will be practically nil for months.

Mills in operation are scheduled 14 weeks ahead on flat rolled stainless. February is about the earliest delivery that can be obtained on electrical sheets, while promises on enameling stock are well extended, that material being used as a substitute for cold rolled sheets in some instances.

Tubular Goods . . .

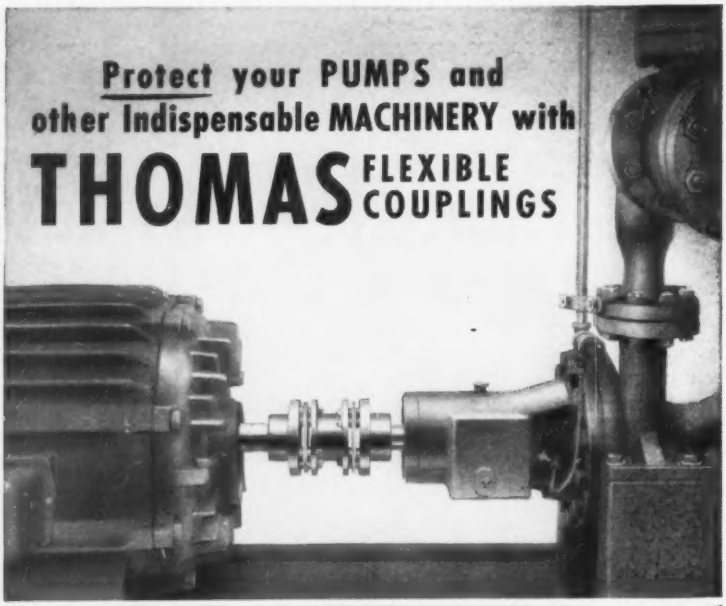
Tubular Goods Prices, Page 159

Poststrike delays in shipping drill pipe are anticipated by one producer because he has been unable to complete the transfer of equipment used in making tool joints from a recently closed plant to one that is strikebound. Since field inventories were irregular when the strike began, the previously sluggish drill pipe market is showing signs of life. Order backlogs are large enough to keep producers running at capacity for the rest of the year.

After the strike, tubemakers will probably rebuild inventories to normal at downriver terminals.

Since standard pipe jobbers carried small inventories before the strike, stocks in the classification are dwindling rapidly. There's enough buttweld capacity to satisfy market demands within 30 days after the mills resume production, but deliveries will probably be delayed because of shortages of certain sizes.

Demand for seamless pipe is greater than that for buttweld, so deliveries will be more extended.



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They will protect your equipment and extend the life of your machines.
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Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
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Exception: Plain end pipe, requiring little finishing, will be shipped soon after the strike.

Oil drilling operations continue ahead of last year's performance. Hughes Tool Co.'s survey for the week ended Sept. 28 showed 2139 rotary rigs at work, seven more than in the preceding week, and 258 more than in the comparable week a year ago.

Distributors . . .

Prices, Page 160

Stocks of steel at service centers are hitting new lows. Some distributors are completely cleaned out of flat rolled sheets and strip. Supplies of carbon and alloy bars and light plates are tight.

Inquiries are being received from distant points as fabricators attempt to fill gaps, particularly in special items. Distributors in Buffalo, for instance, have received inquiries from Detroit and Chicago. Inability to get desired products has forced some consumers to resort to substitutions, particularly in chemical specifications. Some are improvising, such as welding short sections together, or adapting off-sizes.

More foreign steel is being used, but importation has been cut sharply by the dock strike.

Plates . . .

Plate Prices, Page 155

Some leading platemakers don't know where they stand with respect to shipments, and they probably won't know for a few weeks after the strikebound mills resume operations. Most producers, however, feel certain they have at least six months active business ahead. All sizes and widths of sheared plates are in demand.

Inquiry for universal plates has increased sharply. Clad steel plates and heads are also in stronger demand.

Except for a few large contracts booked in the last two months, New England plate fabricating shops are not too poorly fixed for steel. More shops are seeking to place fourth quarter delivery orders, but they are finding that shipments are more likely to be had in January and February.

Warehouses idled by the strike will have substantial plate tonnage for prompt shipment when operations are resumed.

Some premium price plate tonnage is being offered, but is not being snapped up.

Since third quarter order books were full and none of the tonnage could be shipped on schedule, it follows that the mills will run at capacity at least three months after operations are resumed. Sales offices have made little effort to book fourth quarter orders because of the likelihood of changes in specifications before the tonnages can be shipped. Plates ordered for December, it's said, may not be delivered until the sixth month after the strike.

It's possible that plate shipments will reach fairly good volume long before steelmaking furnaces are operating at capacity. There are a lot of slabs behind some of the mills.

To avoid wholesale layoffs, one fabricator in the Pittsburgh area will build towboats with plates originally bought for barges. The boats

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2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding 2B steel with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding 2B steel with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

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BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are regularly supplied in all stainless grades (including 18-8 chrome-nickel and 430 straight chromium), with the exception of 430 Bright which is Type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since No. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Department.

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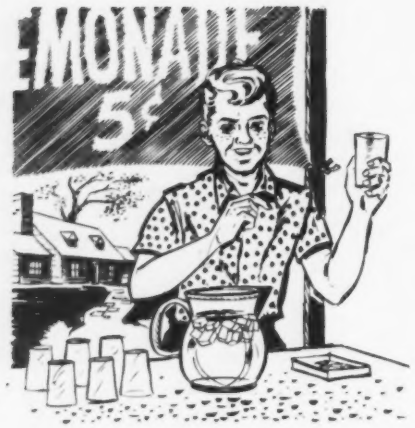

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Longshoremen's Strike Shuts Off Steel Imports

Substantial tonnages of imported steel are still available in the Southwest, but strong demand for steel products of all kinds continues in the area. Rounds and flats, all types of sheets, and light structurals are becoming harder to get.

Gulf Coast longshoremen went on strike Oct. 1, shutting off foreign imports. A prolonged tieup would aggravate the supply situation, deliveries for fourth quarter hinging on settlement of the strike.

Steel Bars . . .

Bar Prices, Page 155

Most consumers' inventories of hot rolled carbon bars are still adequate, but spot shortages are showing up with increasing frequency. Automotive parts suppliers appear to be in the worst plight. Also, indications are that prestrike purchases by the Big Three (GM, Ford, Chrysler) won't sustain current production schedules much longer.

The barmakers anticipate a mad scramble for tonnage after the strike and supply hardships for many users before shipments reach satisfactory volume. Semifinished is rapidly disappearing, and this means delays in getting finished steel production up to capacity quickly.

Rails, Cars . . .

Track Material Prices, Page 158

Forced down for two weeks in September for lack of orders, the Bessemer (Ala.) plant of Pullman-Standard Div., Pullman Inc., reopened last week for a three week period. It is working on an order for 110 PS-1 boxcars from the Louisville & Nashville Railroad.

The plant also has an order for 740 boxcars from the Missouri Pacific Railroad and an order from the Southern Railway System for aluminum boxcars.

About 700 of Pullman's 1700 workers were recalled for the L&N job, and about 1100 will be needed on the Missouri Pacific contract.

The Erie Railroad is recalling 100 furloughed employees at its

Meadville, Pa., car shop to repair boxcars in anticipation of increased freight. Activities at the $4 million shop, opened a year ago, have been curtailed since June.

The Santa Fe Railroad has ordered 200 piggyback flatcars and 155 covered hopper cars. The flatcar orders were placed with General American Transportation Corp.; delivery is scheduled in first quarter next year. The hopper orders went to Pullman-Standard Div., Pullman Inc.

Wire . . .

Wire Prices, Pages 157 & 158

Rod and wire orders for position in poststrike production schedules are building up. Supply of semi-finished steel will be critical for weeks after the mills resume.

One Pittsburgh district mill that has made a substantial comeback in the wire products market since the last critical shortage, seeking to hold its customers, is accepting new orders with delivery geared to resumption of production.

Converters who have been operating at a relatively high rate for nearly three months, mostly on specialties, are now low on more grades and sizes of wire.

Automotive suppliers claim wire stocks provide one of the carbuilders' most critical supply problems.

Iron Ore . . .

Iron Ore Prices, Page 161

With 85 per cent of the Great Lakes ore fleet idled by the steel strike, shipments of Lake Superior iron ore in September amounted to only 758,314 gross tons vs. 8,705,886 tons in the same month a year ago, reports the American Iron Ore Association.

Of the total tonnage moved in the month, 85,172 tons were from U. S. ports vs. 8,368,731 in the same month last year. Canadian ports shipped 673,142 tons vs. 337,155.

In the shipping season to Oct. 1, cumulative shipments were 37,134,135 tons, off 2,649,382 from the 39,783,517 moved to the same date in the 1958 navigation season. U. S. port shipments amounted to 34,202,162 tons vs. 38,276,548 a year ago. Canadian port shipments

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Apex one-piece power bit, to drive socket head screws. ¼" to ⅜" hex shanks. For #5 to 1" cap screws; #10 to 1" set screws.
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amounted to 2,931,973 tons vs. 1,506,969 last year.

Structural Shapes . . .

Structural Shape Prices, Page 155

Structural steel orders are light, but considerable work is pending. Most of it is public construction, bridges, schools, and other institutions of various kinds. Private building is spotty.

It's thought that once the steel labor situation is settled, contracts should increase.

Fabricating shops are busy on work placed earlier this year, and for which supply of steel is adequate. Each new job though demands special sizes. That, combined with shrinking steel inventories, is building up demand for shapes and plates.

Some shops are so low on steel supplies they have been forced to cut back operations 20 to 30 per cent. Indications are they will have to cut considerably more before steel production is resumed, and shape shipments are again scheduled. Right now, deliveries are reported ranging 10 to 18 weeks, and expectations are that range will be still wider by the time the mills get going.

Shipments of fabricated structurals in New England are lower and more nearly approximate bookings. That is due to suspended operations by two of the largest integrated shops, Bethlehem and American Bridge. New contracts taken by district fabricators exceed shipments in most cases, notably in Connecticut.

Despite the growing shortage of steel supplies, fabricators are still going after new contracts. Generally, new work is scarce, many jobs being held up until the steel labor situation is settled.

Fabricators running out of steel hesitate to pay premium prices for material in view of the low prices at which orders were booked.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1225 tons, four highway structures, Interstate Route 95, Section B, Attleboro, Mass., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Campanella & Cardi Construction Co. Inc., Hillsgrove, R. I., general contractor.

825 tons, state highway bridges, Interstate Route 95, Attleboro and North Attleboro, Mass., to Ingalls Iron Works, Birmingham; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

421 tons, Clearview Regional High School, to Belmont Iron Works, Philadelphia, by district board of education, Harrison Township, New Jersey.

325 tons, five bridge structures, Interstate Route 95, Attleboro, Mass., to Tower Iron Works, Providence, R. I.; Campanella & Cardi Construction Co. Inc., Hillsgrove, R. I., general contractor.

300 tons, various small projects in the Pacific Northwest, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

245 tons, I-beam bridge, Waterville-Fairfield, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Frank Rossi, Gardiner, Maine, general contractor.

240 tons, nurses' residence and training school, Metropolitan Hospital, First Ave. at E. 97th St., New York, through Colmar Construction Co., general contractor, to Schacht Steel Construction Inc., New York.

240 tons, six story apartment, 239th St. and Independence Ave., Bronx, N. Y., to Grand Iron Works, New York.

225 tons, six story apartment, Henry Hudson Parkway, Bronx, N. Y., to Grand Iron Works, New York.

215 tons, I-beam bridge, Waterville-Fairfield, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Frank Rossi, Gardiner, Maine, general contractor.

200 tons, six story apartment, W. 13th St., New York, to Grand Iron Works, New York.

200 tons, superstructure, powerplant, second unit, United Illuminating Co., Bridgeport Harbor, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; W. J. Megin Inc., Naugatuck, Conn., general contractor; structural steel to Pittsburgh Bridge & Iron Co., direct by owner.

200 tons, six story apartment, W. 14th St., New York, to Grand Iron Works, New York.

165 tons, widening eight bridges, Wakefield, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Continental Construction Co., Malden, Mass., general contractor.

165 tons, three highway bridges, Lowell, Mass., to Northern Steel Inc., Boston; Coleman Bros. Corp., Readville, Mass., general contractor.

160 tons, science laboratory, Vanderbilt University, Nashville, Tenn., to McCarthy-Jones & Woodard, Nashville; Foster & Creighton Co., Nashville, general contractor.

155 tons, federal office building, Richmond, Va., to Liphart Steel Co., Richmond; Wise Construction Co., Richmond, general contractor.

150 tons, social science building, Brandeis University, Waltham, Mass., to Northern Steel Inc.; George B. H. Macomber Co., Boston, general contractor; structural steel to A. O. Wilson Structural Co., Cambridge, Mass.

130 tons, three highway bridges, Lowell, Mass., to Antonelli Iron Works, Quincy, Mass.; Coleman Bros., Readville, Mass., general contractor.

130 tons, two span composite girder bridge, Willington, Conn., to City Iron Works, Wethersfield, Conn.; Jarvis Construction Co., Manchester, Conn., general contractor; 35 tons, reinforcing bars to the Scherer Steel Co., East Hartford, Conn.

120 tons, state highway bridges, Parsonfield-Porter, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Callahan Bros., Mechanics Falls, Maine, general contractor.

120 tons, three state highway bridges, Hopkinton, N. H., to West End Iron Works, Cambridge, Mass.; J. F. White Contracting Co., Westwood, Mass., general contractor.

118 tons, extension to Lithographing Dept., Owens Illinois Glass Co., Glassboro, N. J., to Belmont Iron Works, Philadelphia; Mahony-Troast Co. general contractor.

110 tons, addition, Wesson Memorial Hospital, Springfield, Mass., to Haarmann Steel Co., Holyoke, Mass.; Ley Construction Co., Springfield, general contractor; 75 tons of reinforcing bars to Truscon Steel Div., Republic Steel Corp., Boston.

100 tons, state highway bridge, over New Haven Railroad, Waterford, Conn., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Westcott Construction Corp.,

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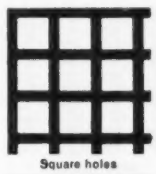
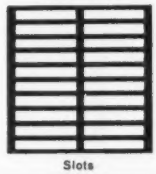
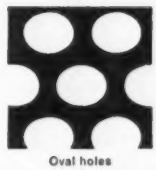
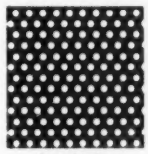
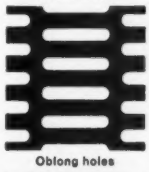

Square holes

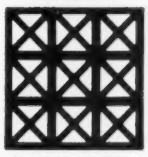

Slots


Oval holes

THOUSANDS OF DIFFERENT PATTERNS AVAILABLE


Round holes


Oblong holes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100 tons, facilities, Honor Annex Farm, Suffolk County jail, Long Island, N. Y., to Bethlehem Fabricators, Bethlehem, Pa.

100 tons, Dravus Street underpass, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

STRUCTURAL STEEL PENDING

2170 tons, Niagara Parkway viaduct, Cleveland to Bellevue Avenues, Niagara Falls, N. Y.; bids Oct. 22, New York State Power Authority.

800 tons, bulkhead and batter piles, Lincoln Memorial Drive at Lafayette Place, Milwaukee; bids Oct. 27, Milwaukee County Park Commission.

500 tons, Brandywine Raceway clubhouse, New Castle County, Delaware, bids asked.

450 tons, Mental Health Center, Delaware County, Pennsylvania; bids to be opened by the State Authority, Harrisburg, Pa., Nov. 11.

255 tons, four-span composite wide flange beam bridge, Putney, Vt.; Lane Construction Corp., Meriden, Conn., low on general contract; also 70 tons of reinforcing bars.

250 tons, reconstruction of Union Avenue bridge, Portland, Oreg.; bids to Oregon Highway Commission, Oct. 13.

120 tons, wide flange beam and angles, General Stores Supply Office, Navy, Philadelphia; bids Nov. 2.

115 tons, four-span composite wide flange beam bridge, Pittsford, Vt.; bids Oct. 16, Montpelier, Vt.; also, 45 tons of reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, Bayview Manor Home, Seattle, to Northwest Steel Rolling Mills Inc., Seattle. This was erroneously reported as a structural placed item in STEEL, Oct. 5.

550 tons, Dravus Street underpass, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Scheumann & Johnson, Seattle, general contractor.

REINFORCING BARS PENDING

1075 tons, outlet works, Waco dam and reservoir, Bosque River, Tex.; bids Oct. 27 to the U. S. Engineer, Ft. Worth, Tex.

918 tons, Niagara Parkway viaduct, Cleveland to Bellevue Avenues, Niagara Falls, N. Y.; bids Oct. 22, New York State Power Authority.

205 tons, state highway structures, including three bridges, Bedford, N. H.; bids Oct. 8.

120 tons, state highway structures, Falmouth, Maine; bids Oct. 7, to Augusta, Maine.

100 tons, including miscellaneous, three bridges, Colville Indian Reservation, Washington State; bids to the U. S. Bureau of Indian Affairs, Portland, Oreg., Oct. 14.

30 tons, also unstated tonnage of prestressed concrete beams; bids to Spokane County, Washington State, Oct. 16.

PLATES . . .

PLATES PLACED

2 million gallon water tank, Ramsey, N. J., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

100 tons, water storage tank, Mather Air Force Base, California, to Pittsburgh-Des-Moines Steel Co., Des Moines, Iowa.

100 tons, elevated water storage tank, Wamego, Kans., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

PIPE . . .

CAST IRON PIPE PLACED

176 tons, 6 to 16 in., Tacoma, Wash., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

66 tons, 6 to 16 in.; bids to Auburn, Wash., Oct. 5.

Shipments of Steel Products—July, 1959

(Net Tons)

Products	Carbon	Alloy	Stainless	Total Seven Months 1959	1958
Ingots	6,313	3,558	671	180,386	153,868
Blooms, etc.	50,574	22,856	823	1,051,949	613,511
Tube rounds	24	81	.....	10,022	5,120
Skelp	1,460	.....	.....	37,815	54,065
Wire rods	43,872	1,495	219	775,851	464,832
Structurals	252,236	1,885	11	3,195,839	2,307,247
Steel piling	22,788	.....	.....	275,978	261,940
Plates	383,085	31,313	3,315	4,403,185	3,070,283
Rails (standard)	42,058	.....	.....	540,690	366,901
Rails (other)	1,376	.....	.....	29,173	25,726
Joint bars	1,462	.....	.....	25,504	23,564
Tie plates	8,147	.....	.....	129,651	77,365
Track spikes	2,147	.....	.....	42,263	26,690
Wheels	15,667	124	.....	159,024	98,865
Axles	3,836	.....	.....	70,524	51,856
Bars (hot rolled)	277,730	88,413	2,250	5,199,294	2,929,843
Bars (reinforcing)	141,801	.....	.....	1,570,424	1,182,839
Bars (cold drawn)	70,863	14,453	2,950	1,047,063	535,945
Tool steel	933	7,080	.....	62,949	38,063
Standard pipe	141,252	25	.....	1,687,580	1,251,388
Oil country goods	116,979	14,041	.....	1,574,481	620,332
Line pipe	183,703	.....	.....	2,295,452	1,631,573
Mech. tubing	48,732	29,668	328	665,307	296,504
Pressure tubing	15,280	3,025	1,310	187,739	144,001
Drawn wire	158,598	2,128	1,254	1,973,233	1,305,673
Nails & staples	20,248	.....	2	251,532	255,090
Barbed wire	1,904	.....	.....	39,437	41,279
Woven fence	5,405	.....	.....	113,089	116,457
Bale ties, etc.	2,819	.....	.....	49,880	46,875
Black plate	32,402	.....	.....	444,742	351,467
Tin-terne plate HD	36,381	.....	.....	319,974	267,345
Tin plate-electro	244,719	.....	.....	3,754,843	3,022,674
Sheets-HR	441,926	16,288	555	5,944,450	3,175,001
Sheets-CR	704,967	3,180	9,736	9,565,381	5,102,126
Sheets-galvanized	180,787	.....	.....	2,057,470	1,506,324
Sheets-coated	21,519	.....	.....	187,860	88,169
Elec. sheets-strip	1,510	34,563	.....	439,361	244,852
Strip-HR	70,544	1,560	242	969,539	509,462
Strip-CR	64,764	1,145	9,909	974,666	507,805
Totals 1959	3,820,811	276,881	33,575	52,333,600	.....
Totals 1958	3,877,295	172,122	32,327	.....	32,772,920

Data from American Iron & Steel Institute.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Oct. 11	Change	Same 1958	Week 1957
Pittsburgh	2	0	67	84
Chicago	5.5	0	84	86
Eastern	11	0	68	84.5
Youngstown	9	0	55	70
Wheeling	55.5	+ 2	82	82
Cleveland	6	0	74.5	86.5
Buffalo	4	0	66	100
Birmingham	9	0	65.5	70.5
Cincinnati	69	+ 7*	74	77.5
St. Louis	60.5	— 1*	94	82.5
Detroit	26	0*	78	102
Western	6	0	75	94
National Rate	13	+ 0.2*	71.5	81

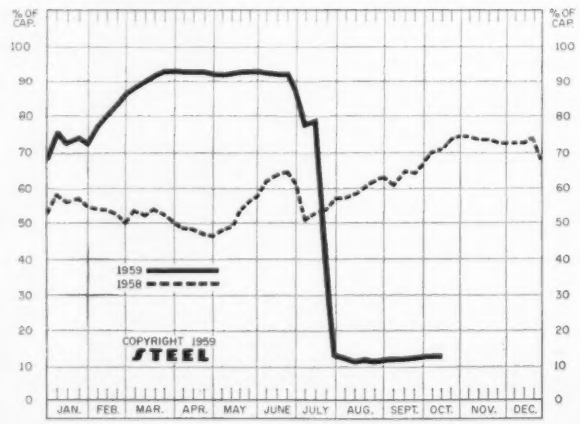
INGOT PRODUCTION

	Week Ended Oct. 11	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	22.9†	22.5	20.4	120.3
NET TONS (In thousands)	368†	362	327	1,933

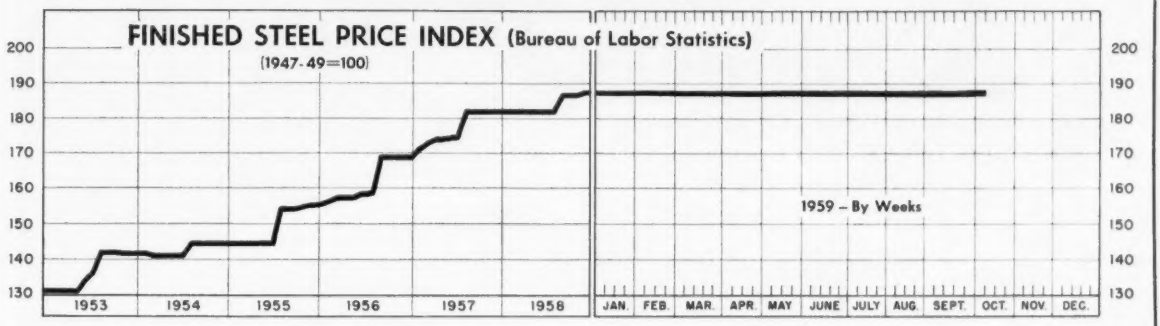
*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.

Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Oct. 6, 1959	Week Ago	Month Ago	Sept. Index	Year Ago
186.8	186.8*	186.7	186.7	186.7

*Revised

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 6

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.695
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.583
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.772
		Woven Wire Fence (20-rod roll)	21.847

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 7 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	246.65	194.53
Index in cents per lb	6.713	6.713	6.713	6.682	5.270

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.28	$117.95
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	43.00	43.00	40.00	42.33	32.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 7 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh ../	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.30	$9.05

*Including 0.35c for special quality.

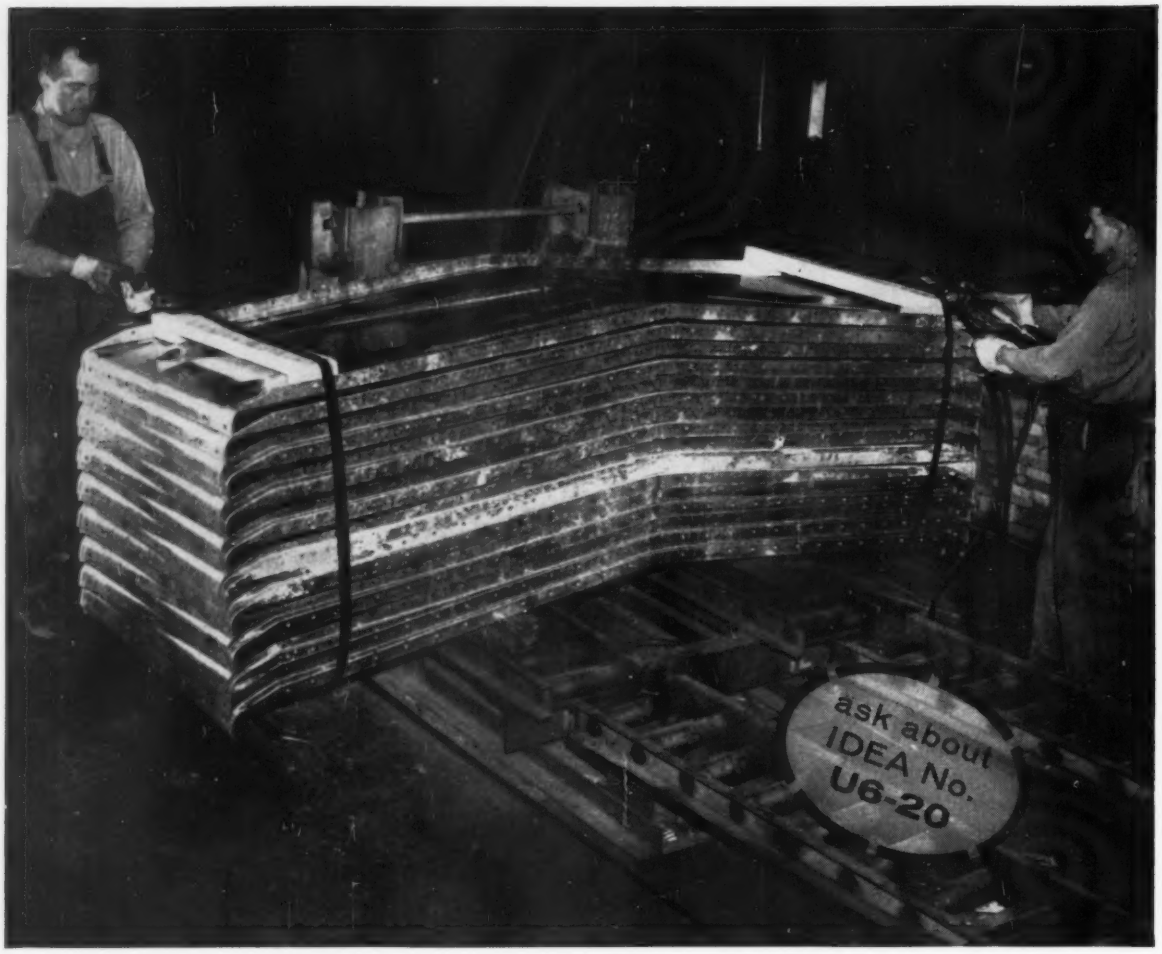
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods ⅜-⅝" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Oct. 7 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld., Cin.	70.20	70.20	70.20	70.20	60.62
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$44.50	$44.50	$38.50	$43.50	$32.50
No. 1 Heavy Melt, E. Pa.	44.00	44.00	41.00	42.00	30.50
No. 1 Heavy Melt, Chicago	40.50	40.50	40.50	41.50	33.00
No. 1 Heavy Melt, Valley	44.50	43.50	41.50	43.50	35.00
No. 1 Heavy Melt, Cleve.	41.50	40.50	38.50	40.00	32.00
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	35.50	30.50
Rails, Rerolling, Chicago	64.50	62.50	62.50	63.50	51.50
No. 1 Cast, Chicago	56.50	56.50	55.50	43.50	39.50

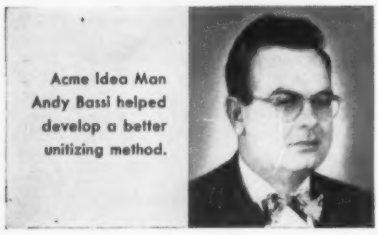
COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



Check your AIM*...Standard Railway Equipment does...

Pneumatic tools speed unitizing operation

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY, HAMMOND, INDIANA, uses pneumatic stretchers to unitize freight car roof sections. Their Acme Idea Man suggested to this leading company that pneumatic stretchers would increase the speed and efficiency of the strapping operation. (Idea U6-20)



Acme Idea Man Andy Bassi helped develop a better unitizing method.

The pneumatic stretchers provide effortless, continuous strapping takeup to a pre-set, uniform tension. By tensioning steel strapping simultaneously around both ends of the units of roof sections, greater compression of the units can be obtained, enabling three of them to be loaded across the width of a gondola car. Strapping is used directly from the coil rather than in cut lengths, eliminating waste. The men find strapping quicker and easier to apply. Shipments move out of the plant faster, and arrive at their destination in excellent condition.

***Check Your Acme Idea Man.** His fund of knowledge may be what you need to help solve your materials handling or shipping problem. Call him at your nearest Acme Steel Office. Or write Dept. SDU-109, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 3, Ontario.

ACME STEEL **STEEL STRAPPING**

Steel Prices

Mill prices as reported to STEEL, Oct. 7, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 156; footnotes, page 158.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ..80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99 50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2. T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ...140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119 00
Munhall,Pa. U5 .....119.00
Owensboro,Ky G8 ...119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5 W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .. ...119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6 50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5 50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer, Ala. T2 ....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5 50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5 50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana Calif. K1 .....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N Y. B2 ..5 55
Munhall Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6 80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg Pa. P4 .....5.30
Houston S5 .....5.40
Ind Harbor,Ind. I-2, Y1 5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale Ill. A1 .....5.30
Seattle B3 .....6 20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5 30
Steubenville,O. W10 ....5 30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ...5.30

PLATES, Carbon Abras. Resist.
Claymont Del. C22 ....7.05
Fontana Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ...7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 ....7.50
Coatesville, Pa. L7 ....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 ....8.30
Gary Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa.(9) J5 ..5.675
Alton Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa. (9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ..5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3, N14..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12..5.675
Torrance Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.275
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. R2 ..8.30
LosAnge'es B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14 8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity Mo.(9)S5 ..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5 675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6 80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2, 7.65
Birmingham C15 .....8 25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAnge'es(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.85

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9 625
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ..9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)
AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4.5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)
Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron
Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 .. 14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel
ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)
AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)
Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy
Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)
Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron
Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)
AlabamaCity,Ala. R2 .6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron
Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped
AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing
Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy
Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel
Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)
Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized
Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated
Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron
Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage
Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)
BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel ofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	....	....	18.85	22.95	27.80
Buffalo W12	....	....	18.85	....	....
Fostoria,O. S1	....	....	19.05	22.15	....
FranklinPark,Ill. T6	....	....	19.20	23.30	28.15
Harrison,N.J. C18	....	....	18.85	22.95	27.80
NewYork W3	....	....	18.85	22.95	27.80
Palmer,Mass. W12	....	....	18.85	....	....
Trenton,N.J. R5	....	....	18.85	22.95	27.80
Worcester,Mass. A7, T6	....	....	18.85	22.95	27.80
Youngstown S41	....	....	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G4	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193••
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198••
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198••
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198••
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193••
S.SanFrancisco C10	213•
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187••
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192••
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192••
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192••
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187••
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40••
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65••
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65••
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75••
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55••
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80••
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
Kans.City(48) S5	9.25 9.80••
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55••
S.SanFran. C10	9.95 10.50••
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65†
Worcester,Mass.A7	9.30 9.85†

Based on zinc price of: •13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. ••Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
⅝ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts
(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS
(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:	
All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy	
Hot Pressed & Cold Punched:	
¾ in. and smaller	62.0
⅞ in. to 1⅛ in., incl.	56.0
1⅛ in. and larger	51.5
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5
Hex Nuts, Finished (Incl. Slotted and Castellated):	
⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5
Semifinished Hex Nuts, Reg. (Incl. Slotted):	
⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:	
6 in. and shorter:	
⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0
High Carbon, Heat Treated:	
6 in. and shorter:	
⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0
Flat Head Cap Screws:	
¾ in. and smaller, 6 in. and shorter	+85.0
Setscrews, Square Head, Cup Point, Coarse Thread:	
Through 1 in. diam:	
6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85. 7/16 in. and smaller by 6 in. and shorter: 15% off list.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa, Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¾ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c. finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown B2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co., Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.10	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.595	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54(a)	8.79(b)	10.87(a)	52.33	10.32(c)	8.75(d)	11.25#	15.16	9.39	8.71(e)	10.50(f)
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54(a)	8.79(b)	10.76(a)	52.33	10.30(c)	8.64(d)	11.25#	15.05	9.00	8.47(e)	10.26(f)
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.
(a)10 Ga.; (b)20 Ga.; (c)¼ x 1 in.; (d)¾-2½ in.; (e)¼ x 84 in.; (f)¼ x 36.
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 6000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [9]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckloits, freight allowed east of Mississippi River:	
100 mesh, bags	11.25
100 mesh, pails	9.10‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	36.00
Unannealed (99+% Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16 plus 100 mesh).	29.00
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l.	38.50; ton lots 40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.20-50.70†
Bronze, 5000-lb lots	52.10-56.10†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	52.70-57.10†
Phosphor-Copper, 5000-lb lots	64.50
Copper (atomized) 5000-lb lots	45.00-53.50
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.20-32.40‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium, electrolytic 99.8% Cr, min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.18	....	$6.13	$6.04	$6.41
Bar Size Angles	6.18	....	6.13	6.04	6.41
Structural Angles	6.03	....	5.98	5.88	6.28
I-Beams	6.03	....	5.98	5.88	6.28
Channels	6.03	....	5.98	5.88	6.28
Plates (basic bessemer)	5.95	....	5.90	5.80	6.20
Sheets, H.R.	9.00	....	8.95	8.85	9.25
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.90	....	9.85	9.75	10.25
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	10.05	....	10.00	9.90	10.30
Sheets, C.R. (drawing quality)	10.00	....	10.95	10.85	11.25
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.50	....	25.28	24.99	26.68
Barbed Wire (†)	8.00	....	7.95	7.85	8.25
Merchant Bars	6.18	....	6.13	6.04	6.41
Hot-Rolled Bands	8.90	....	8.85	8.75	9.15
Wire Rods, Thomas Commercial No. 5	6.40	....	6.40	6.25	6.60
Wire Rods, O.H.	6.90	....	6.90	6.75	7.10
Bright Common Wire Nails (§)	8.40	....	8.45	8.35	8.75

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$16-$17†
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88.5-91.5c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	29.00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene one deg (deld. east of Rockies).	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-16% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N.Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

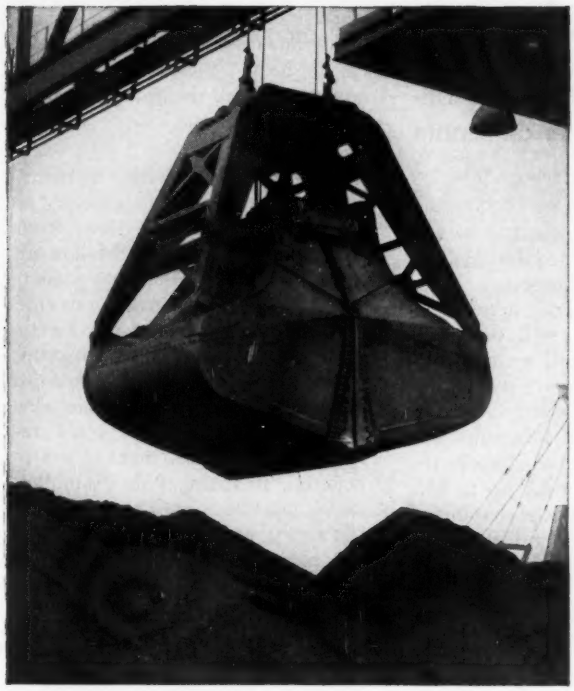
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



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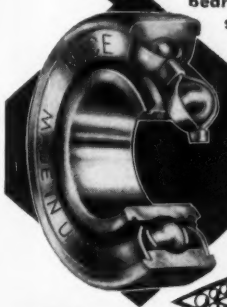

WRITE FOR CATALOG NO. 190

NICE

NICE BALL BEARING CO.
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DIVISION OF CHANNING CORPORATION

Scrap Is Holding Recent Advances

STEEL's composite on No. 1 heavy melting grade seems firmly established at $43. Buying light, but dealers anticipate sharp pickup when steelmaking resumes

Scrap Prices, Page 166

• **Pittsburgh**—The market is "hot." Not much scrap is moving, but it's almost a certainty that steelmaking will be resumed shortly. Bids on B&O railroad scrap were $3 to $4 higher than last month's. Chances are good that the Pennsylvania Railroad will get at least $50 for its No. 1 heavy melting. Dealer grades are higher on appraisal.

• **Chicago**—Speculation that steelmaking will resume under Taft-Hartley action is keeping the market bullish. Apparently, brokers and dealers figure the mills will favor heavy use of scrap, seeking to conserve iron ore.

The inference is that scrap will be acquired in substantial amounts. Some observers point out, however, that no rush to acquire melting material can be expected, since mills have heavy scrap inventories, and supply of ore will not be a serious problem until spring.

• **Philadelphia**—A spurt in domestic demand for No. 1 bundles and No. 1 busheling has forced the market on those grades up to $46, delivered. Also, special buying of low phos structurals and plates has pushed prices on that grade to $47-$49, delivered.

Embargoes due to the longshoremen's strike have caused no noticeable easiness in the market on No. 1 heavy melting, No. 2 heavy melting, and No. 2 bundles, all in good demand on export account.

• **New York** — Despite the dockworkers' strike, brokers' buying prices have advanced $1 a ton on No. 1 heavy melting to $33-$34, and on No. 2 heavy melting to $30-$31.

• **Cleveland**—The market is pointing higher despite the absence of heavy buying. Strength stems from anticipated active demand following resumption of steelmaking operations. While mill inventories are substantial, it's thought the threatened shortage of iron ore next spring may prompt steelmakers to use more scrap in their melts as an ore conservation measure. This could result in a heavy movement of dealer material, including No. 2 bundles, which have been hard to peddle the last several years.

• **Youngstown**—Luntz Iron & Steel Co., Warren, Ohio, will scrap 17 steam locomotives and 35 freight cars acquired from the Pennsylvania Railroad. The scrap is expected to be shipped to a Valley mill that has operated throughout the strike.

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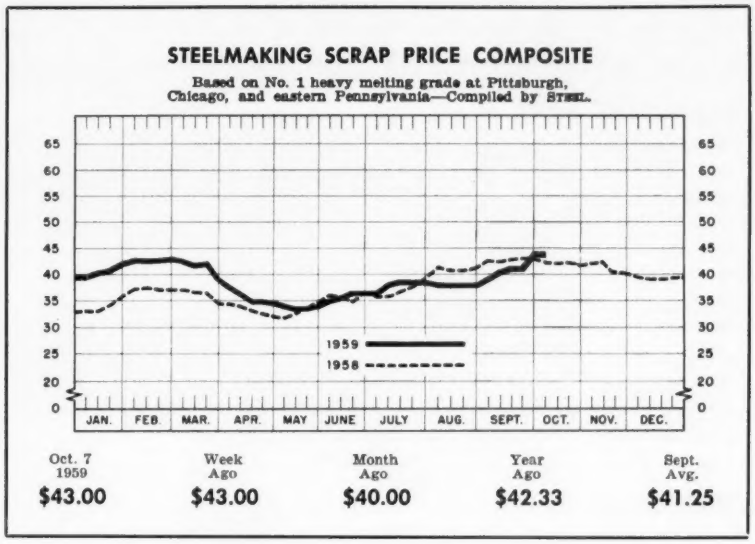
Best for impact type cleaning machines.
CUT STEEL WIRE SHOT (Hard Drawn Cut Steel Wire)
Extensively used in peening springs and other metal parts.
Catalog No. AB-57 will give you further details on these stocked items, as well as those manufactured as ordered.
Free cost system installed
A S G
ABRASIVE SHOT & GRIT COMPANY INC.
Phone: Lyceum 2-2816 Teletype: Springville NY 502
manufacturers of BLASTRITE quality abrasives



• **Detroit**—Prices are unchanged. However, dealers and brokers think the market will hold steady the next couple of weeks barring a sudden settlement of the steel strike.

Dealers report Chrysler withdrew some scrap offered in its monthend lists. The action, it's thought, was taken to permit the auto company to ship some material on a conversion deal, presumably to Lone Star Steel Co., Lone Star, Tex.

• **Buffalo**—No new business has appeared on which to hang price advances. Some dealers think the market should be $2 to $3 a ton above present nominal quotations, but until the mills re-enter the market there's no way of substantiating these "guesses."

• **Cincinnati** — The steelmaking grades of scrap are quoted $1 a ton higher here. Anticipated poststrike demand provides the market push. No. 1 heavy melting is quoted by brokers at $36.50-$37.50. Strong bidding on industrial material is being reflected in a stronger dealer market.

• **St. Louis**—The market continues strong, but the area mills aren't getting in much material despite their willingness to buy. Dealers are simply holding on to their supplies, anticipating a sharp price rise when steelmaking is resumed at presently strikebound mills.

A few grades have inched higher: No. 2 heavy is up to $36; machine shop turnings to $19; short shoveling turnings to $21; and rails (18 in. and under) to $55.

• **Birmingham**—Although scrap is moving slowly here, some brokers insist that the market is strong, and they expect prices to go higher.

• **Houston**—Japanese demand continues to support the market. The longshoremen's strike deflated buying pressure, but prices have held. The flow of country scrap has increased. Shipments to the Lone Star mill have picked up, and brokers are now confident of filling their commitments before Oct. 24.

• **Seattle**—Dealers report the mills have withdrawn from the market as their inventories are adequate and storage space is limited. While prices are nominal, they are firm at $35 for No. 1, $32-$33 for No. 2, and $25 for No. 1 bundles.

Japan is reported in the market for third quarter needs amounting to around 70,000 tons.

• **Los Angeles** — Scrap is moving slowly but prices are steady. Dealers' yards are bulging with stocks and no sharp price rise is expected when the steel strike is settled.

The export movement has become fairly well defined. Four or five ships leave Los Angeles harbor monthly with about 9000 tons of scrap each, of which 40 per cent is No. 1 steel, 40 per cent is No. 2, and 20 per cent is No. 2 bundles. Some 80 shiploads are expected to leave West and Gulf Coast ports during the fourth quarter with a total of 800,000 net tons.

• **San Francisco**—Dealers say large tonnages are expected to be exported to Japan from Pacific Coast ports in the current quarter.

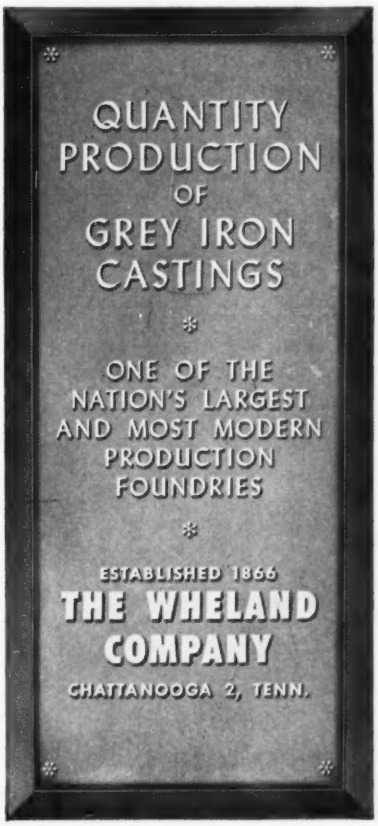
Scrap Use Cut Sharply In July; Data Skimpy

Purchased scrap consumption by foundries and nonstruck steel mills during July was estimated at 551,000 gross tons, reports the Institute of Scrap Iron & Steel Inc., Washington. An additional unknown tonnage was consumed up to the steel strike deadline July 15, but the figures are not available from the mills.

It's estimated 1,006,000 tons of purchased and home scrap were used during the month vs. 6,324,000 tons in June. Consumption in July, 1958, was 3,717,000 tons.

The U. S. Bureau of Mines estimates 6,700,000 tons of pig iron and scrap were consumed in the first

(*Please turn to Page* 172)



Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Oct. 7, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 7	$43.00
Sept. 30	43.00
Sept. Avg.	41.25
Oct. 1958	42.25
Oct. 1954	32.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	45.00-46.00
No. 2 bundles	31.00-32.00
No. 1 busheling	*43.00-44.00*
No. 1 factory bundles	52.00-53.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Cut structurals:	
2 ft and under	*50.00-51.00*
3 ft and under	*49.00-50.00*
Heavy turnings	35.00-36.00
Punchings & plate scrap	*51.00-53.00*
Electric furnace bundles	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	*34.00-35.00*
Clean auto cast	*47.00-48.00*
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt	*48.00-49.00*
Rails, 2 ft and under	*62.00-63.00*
Rails, 18 in. and under	*63.00-64.00*
Random rails	*59.00-60.00*
Angles, splice bars	*56.00-57.00*
Railroad specialties	*56.00-57.00*
Rails, rerolling	*65.00-66.00*

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	41.00-42.00
No. 1 hvy melt., dealer	39.00-40.00
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	*46.00-47.00*
No. 1 dealer bundles	40.00-41.00
No. 2 bundles	26.00-27.00
No. 1 busheling, indus.	41.00-42.00
No. 1 busheling, dealer	39.00-40.00
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*24.00-25.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Cut structurals, 3 ft	50.00-51.00
Punchings & plate scrap	51.00-52.00

Cast Iron Grades

No. 1 cupola	56.00-57.00
Stove plate	52.00-53.00
Unstripped motor blocks	47.00-48.00
Clean auto cast	62.00-63.00
Drop broken machinery	62.00-63.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	63.00-64.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Angles, splice bars	55.00-56.00
Axles	*56.00-57.00*
Rails, rerolling	*64.00-65.00*

Stainless Steel Scrap

18-8 bundles, solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 busheling	*46.00-47.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*28.00-29.00*
Machine shop turnings	*18.00-19.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Low phos.	*47.00-48.00*
Electric furnace bundles	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00-47.00*

CLEVELAND

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 factory bundles	46.00-47.00
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*15.00-16.00*
Short shovel turnings	*21.00-22.00*
Mixed borings, turnings	*21.00-22.00*
Cast iron borings	*21.00-22.00*
Cut foundry steel	*41.00-42.00*
Cut structurals, plates 2 ft and under	*51.00-52.00*
Low phos. punchings & plate	*43.00-44.00*
Alloy free, short shovel turnings	*23.00-24.00*
Electric furnace bundles	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	*55.00-56.00*
Charging box cast	*41.00-42.00*
Heavy breakable cast	*41.00-42.00*
Stove plate	*47.00-48.00*
Unstripped motor blocks	*39.00-40.00*
Brake shoes	*39.00-40.00*
Clean auto cast	*58.00-59.00*
Burnt cast	*40.00-41.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

R.R. malleable	*66.00-67.00*
Rails, 2 ft and under	*61.00-62.00*
Rails, 18 in. and under	*62.00-63.00*
Rails, random lengths	*55.00-56.00*
Cast steel	*49.00-50.00*
No. 1 railroad cast	*58.50-59.50*
Railroad specialties	*55.00-56.00*
Angles, splice bars	*55.00-56.00*
Rails, rerolling	*70.00-71.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	38.00
No. 2 heavy melting	*36.00*
No. 1 bundles	43.00
No. 2 bundles	26.00
No. 1 busheling	43.00
Machine shop turnings	*19.00*
Short shovel turnings	*21.00*

Cast Iron Grades

No. 1 cupola	54.00
Charging box cast	45.00
Heavy breakable cast	44.00
Unstripped motor blocks	44.00
Clean auto cast	56.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00
Rails, 18 in. and under	*55.00*
Rails, random lengths	50.00
Rails, rerolling	63.00†
Angles, splice bars	50.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	45.00-46.00
Structurals & plates	44.00-45.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	38.00-39.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	41.00-42.00
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	52.00-53.00
Rails, rerolling	*63.00-64.00*
Rails, random lengths	46.00-47.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	44.00
No. 2 heavy melting	38.00
No. 1 bundles	*46.00*
No. 2 bundles	29.00
No. 1 busheling	*46.00*
Electric furnace bundles	46.00
Mixed borings, turning	21.00-22.00†
Short shovel turnings	26.00
Machine shop turnings	*24.00*
Heavy turnings	35.00†
Structurals & plates	*47.00-49.00*
Couplers, springs, wheels	48.00
Rail crops, 2 ft & under	*64.00*

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable cast	*48.00*
Drop broken machinery	*54.00*
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 bundles	32.00-33.00
No. 2 bundles	21.00-22.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*36.50-37.50*
No. 2 heavy melting	*31.50-32.50*
No. 1 bundles	*36.50-37.50*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*36.50-37.50*
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*18.00-19.00*
Short shovel turnings	*20.00-21.00*
Cast iron borings	*19.00-20.00*
Low phos., 18 in.	47.00-48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	49.00-50.00

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 2 bundles	25.00-26.00

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos, plates & structurals	45.50-46.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	33.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*25.50-26.50*
No. 1 bundles	*33.00-34.00*
No. 1 busheling	*33.00-38.00*
Machine shop turnings	11.00-12.00
Short shovel turnings	13.00-14.00
No. 1 cast	37.00-38.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	38.00-38.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No 1 heavy melting	36.50-37.50
No. 2 heavy melting	24.00-25.00
No. 1 bundles	39.50-40.50
No. 2 bundles	23.00-24.00
No. 1 busheling	35.50-36.50
Machine shop turnings	15.00-16.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	17.00-18.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	41.00-42.00
Heavy breakable	40.00-41.00
Unstripped motor blocks	33.00-34.00
Charging box cast	40.00-41.00
Clean auto cast	51.00-52.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	*25.00*
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00-39.00*
No. 2 heavy melting	36.00*
No. 1 bundles	33.00
No. 2 bundles	20.00
Machine shop turnings	16.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

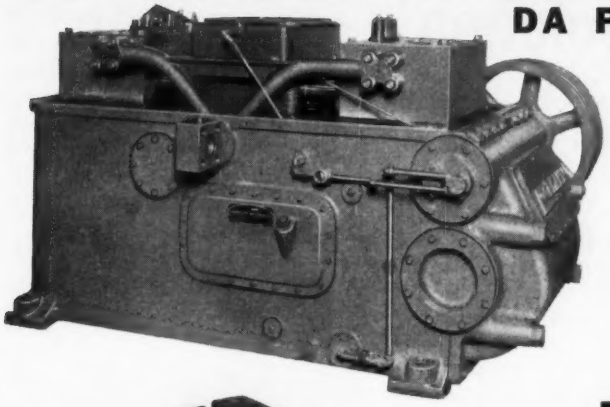
No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

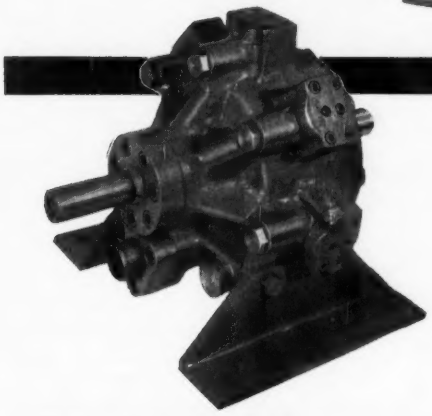
*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

LOGEMANN HIGH PRESSURE PUMPS



DA PUMPS . . . *Opposed cylinder, Reciprocating-plunger, double pressure type.*

Logemann DA Pumps are close-coupled to occupy minimum floor space. They have six plungers, operating three each in two cylinder blocks. In double pressure applications both cylinders deliver large fluid volume to a common discharge line, up to a predetermined low pressure. The low pressure cylinder is then automatically cut out by an adjustable unloading valve and high pressure cylinder continues to deliver fluid until maximum pressure is reached. Pumps are equipped with anti-friction bearings and automatically lubricated by combination splash and pressure system fed by a lubricating pump. Are totally enclosed, with cover provided for inspection and maintenance. Drive is through multiple V-belts for quietness. Available in various sizes.



RA PUMPS

84 GPM for pressures up to 1500 psi
42 GPM for pressures up to 3000 psi

These are radial rotary plunger type pumps with hydraulically operated suction and discharge valves. Both are totally enclosed and extremely compact for limited space conditions. Seven plungers. Cylinder, plungers and valves are Nitralloy. Crankshaft rotates on tapered roller bearings and is counterweighted to minimize vibration. Drive from motor is through flexible coupling.

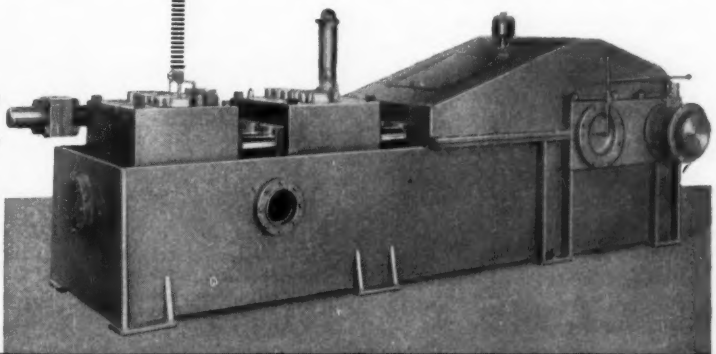
14-AX High Pressure Test PUMP

This is a vertical triplex type for pressures as high as 50,000 psi. —and is extensively used on pressure and burst tests. Short plunger stroke and low crankshaft speed reduces fluid delivery for easy observation of gauges and control during pressure tests. Designed for use with water, has non-corrosive cylinder block, and the plungers, valves and valve seats are Nitralloy. This type is also obtainable for lower pressures and for other applications such as press operation.

145-A PUMP

Horizontal triplex tandem type

Designed to deliver high gallonage (371 GPM) at pressures up to 1000 psi and reduced gallonage (128 GPM) between 1000 and 3000 psi. Changeover from low to high pressure is made by an automatic unloading valve. Crankshaft, connecting rods and drive are enclosed in an oil-tight, dust-proof cover. Gears are continuously sprayed with oil under pressure; connecting rod bearings are pressure lubricated; and crosshead slides operate in an oil bath. The lubricating oil is pump circulated, and all cylinders are machined from solid steel blocks. This tandem type is also obtainable in smaller sizes.



LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 45, WISCONSIN

Strikes No Nearer Solution

There has been a vacuum in negotiations as both sides wait to see what happens in steel. Feeling is Taft-Hartley will be used to end steel, dock, and maybe copper walkouts

Nonferrous Metal Prices, Pages 170 & 171

ANY QUICK BRIDGING of the chasm of differences separating nonferrous producers and Joe Worker seems as far away as it was two months ago. If anything, strike pressures have intensified with the walkout of workers at nonferrous facilities in Africa and Chile and the threat of more picket lines being set up in the U. S. as contracts expire in other industries.

Aggravating the market is the walkout by dockworkers at East and Gulf Coast ports, which has cut off imports of needed metals and ores, particularly copper and (to a lesser extent) zinc. It's estimated only a little better than half of the foreign copper consigned to the U. S. for September delivery was unloaded and moved off the docks before longshoremen struck.

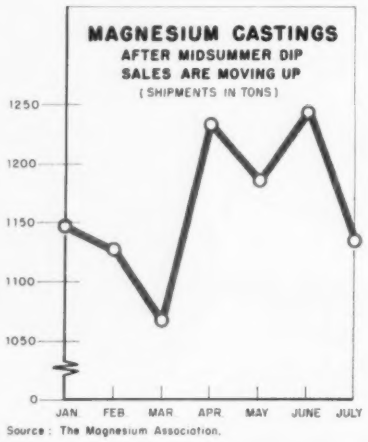
• **Waiting for Steel**—Attitudes and actions over the last few weeks have made one thing clear. No major contracts will be signed in the nonferrous field until the steel impasse is resolved, unless one side or the other virtually surrenders.

Let's look at the facts: The aluminum companies and the unions (USW, AWI, UAW) agreed back in the summer to extend the contract which expired Aug. 1 until 30 days after the steel dispute ends, or Nov. 1, whichever is sooner. If steel is still out Nov. 1, the contract will undoubtedly again be extended. Regardless of what you hear in some quarters, steel is the pacesetter and neither side wants to commit itself too heavily until a settlement is reached in the basic metal industry.

• **Copper Also Quiet** — The same general statements apply to copper. Although the strike (it has shut down around 85 per cent of domestic output) is 63 days old today (Oct. 12), and although about 195,000 tons of refined production has been lost, there have been only sporadic indications that the unions were retreating even slightly from their original demands.

Last week, both Kennecott Copper Corp. and Anaconda Co. got together with the union leaders, but the feeling was that the talks wouldn't result in an early agreement.

Kennecott has made the largest offer of any of the strike-bound copper companies (its 18-cents-an-hour-plus package was turned down by the USW in early August). Other companies say they won't and can't go that high. Anaconda Co., for instance, which has a high per ton mining cost, has told the union it is willing to negotiate in the area of 6.7 cents an hour—no higher.



Source: The Magnesium Association.

As in aluminum, copper negotiators are keeping a close eye on steel. The steel settlement will sharply affect copper but may not set a pattern because of the mine cost factors.

These factors are further clouding the picture:

1. Kennecott's 190,000 ton a year El Teniente mine in Chile is closed by a strike. So are large facilities in the Belgian Congo owned by Katanga. Those factors plus the dock strike are pinching the already tight supply situation.

2. Custom smelter copper has been priced on the basis of 33 cents a pound plus duty, which brings the cost to 34.7 cents.

3. Bridgeport Brass Co. is shut down by the first strike in its 97 year history.

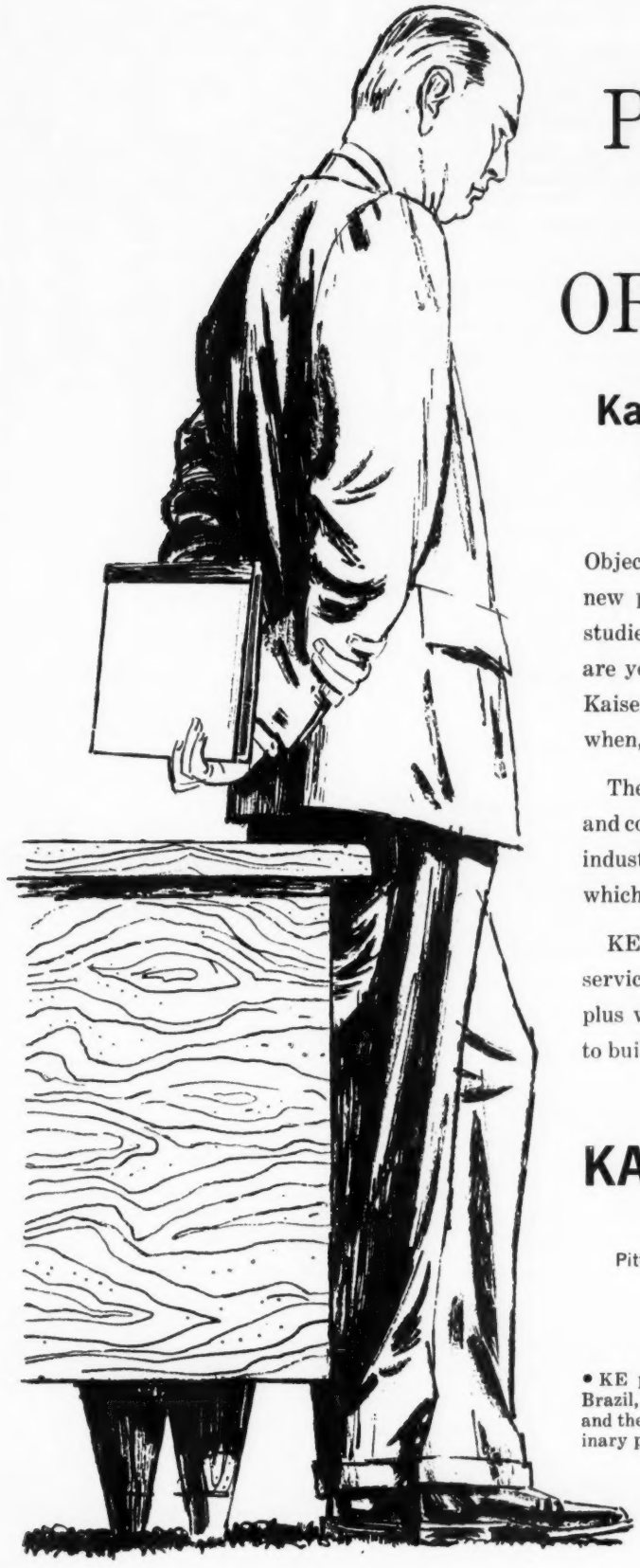
• **Lead-Zinc**—The lead-zinc labor situation hasn't changed. Only new developments: Mine-Mill extended a contract with Bunker Hill Co. until Oct. 15. American Smelting & Refining Co. signed a two year contract with the USW at its Amarillo, Tex., zinc smelter (which hadn't been on strike) calling for an 8 cent an hour increase.

• **What's Likely**—Informed Washington sources look for an injunction to be obtained under provisions of the Taft-Hartley Act to halt the steel (and perhaps the copper) walkouts. At presstime, President Eisenhower had invoked T-H in the dock strike.

NONFERROUS PRICE RECORD

	Oct. 7 Price	Last Change	Previous Price	Sept. Avg	Aug. Avg	Oct., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	30.00–33.00	Aug. 31, 1959	30.00	31.500	30.010	25.058
Lead	12.80	Aug. 24, 1959	11.80	12.800	12.069	12.437
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	103.125	Oct. 7, 1959	103.25	102.440	102.333	96.500
Zinc	12.00	Sept. 21, 1959	11.00	11.360	11.000	10.865

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.



PROCEED, DEFER OR MODIFY?

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Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

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• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5458-5

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.40 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00-31.50 deld.; custom smelters, 33.00; lake, 31.50 deld.; fire refined, 29.75-31.25 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $223-225 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 103.125.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.00-3.80.

Zinc: Prime western, 12.00; brass special, 12.25; intermediate, 12.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 13.25; special high grade, 13.50 deld. Diecasting alloy ingot No. 3, 15.25; No. 2, 15.75; No. 5, 15.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.50; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.85; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.125-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.85
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 10.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-23.75; No. 2 heavy copper and wire, 21.50-21.75; light copper, 19.50-19.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 31.50c) Clean Heavy	Rod Ends	Clean Turnings
Copper	54.63b	52.86c	....	55.82	27.500	27.500	26.750
Yellow Brass	48.65	34.21d	49.19	52.06	21.000	20.125	19.125
Low Brass, 80%	51.48	51.42	52.02	54.79	23.500	23.250	22.750
Red Brass, 85%	52.48	52.42	53.02	55.79	24.375	24.125	23.625
Com. Bronze, 90%	54.02	53.96	54.56	57.08	25.250	25.000	24.500
Manganese Bronze	57.00	50.68	61.12	....	19.750	19.500	18.875
Muntz Metal	51.35	46.66	....	....	19.875	19.625	19.125
Naval Brass	53.29	47.10	59.85	56.70	19.625	19.375	18.875
Silicon Bronze	60.67	59.86	60.21	78.35	27.000	26.750	26.000
Nickel Silver, 10%	64.13	66.46	66.46	....	25.875	25.625	12.812
Phos. Bronze	75.34	75.84	75.84	77.02	28.625	28.375	27.375

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.50-17.75; new brass clippings, 15.50-16.00; light brass, 12.00-12.50; heavy yellow brass, 13.00-13.50; new brass rod ends, 13.50-14.00; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 14.75-15.25; brass pipe, 15.00-15.50.

Lead: Soft scrap lead, 8.75-9.25; battery plates 4.50-4.75; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt 9.25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.50; light copper 22.50; refinery brass (60% copper) dry copper content, 24.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire 27.00; No. 2 heavy copper and wire, 24.50; light copper, 22.50; No. 1 composition borings, 21.50; No. 1 composition solids, 22.00; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.40.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 41.00, 2000-5000 lb lots; cast, 43.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 19.50; flat tops, 19.50; flats, 22.25; ovals, 21.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.35; 2000-5900 lb, 13.35; 6000-11,900 lb, 13.10; 12,000-22,900 lb, 12.85; 23,000 lb or more, 12.35.

Nickel Chloride. 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

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Companies, well and favorably known, superior financial strength, are in "high ticket" special machinery fields, selling at six-figure prices. This equipment—engineered on special order, built by our clients and installed in customers' plants—compares in size, utility and cost with that used by major producers and processors of strip and coil metals, both non-ferrous and ferrous.

Growth and expansion have produced requirements at "chief" and "project" level. Substantial five-figure salaries, fringe benefits and growth potential are adequate to satisfy the superior type of men our clients will engage. Clients handle our fees and your relocation expense.

If you have a proven record of progress, have attained "chief" or "project" level responsibilities in product areas suggested and are a graduate engineer—you are invited to investigate these outstanding opportunities. Please furnish a resume of your background in full confidence—no reference checks without permission.

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A centrally located steel plant is in need of a man with Hot and Cold Strip experience and some melting, with ability to accept supervisory responsibilities with opportunity for later promotion to top level management. Prefer man age 50 years or under. All replies will be kept confidential and should include complete information concerning age, educational background, employment history and salary expected. Reply Box 792, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

PLANT SUPERINTENDENT OR WELDING ENGINEER. Background as Welding Engineer, Plant Manager, Superintendent in all types of welded fabrication, including pressure vessels, cryogenic equipment, structural, plate and sheet metal. Age 41. 20 years experience. Strong on union negotiation. Proven ability in cost reduction. Reply Box 793, STEEL, Penton Bldg., Cleveland 13, Ohio.

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One used D & H floor type, horizontal boring, milling and drilling machine. 6½" bar, horizontal travel—24 ft., vertical—12 ft., bar travel—62 inches. Power R.T. to head and column.

One #5 Gisholt Universal Turret Lathe, automatic chuck and bar feed. Threading attachments, pump, etc.

Three #3 Gisholt Universal Turret Lathes, automatic chuck and bar feeds (one has extended bed—24" extra length), pump, etc.

One #1-L Gisholt Universal Saddle type Turret Lathe, automatic chuck and bar feed. Taper and threading attachments to cross slide, pump, etc.

One Baker, Model #25 Keyseater—S.P.D.

One #2-20 Kent-Owens Vertical Mill. #40 taper in spindle pump and one set of change gears.

One Hossfield power bender with Vickers hydraulic system and some dies.

One 10-ton Northern Engineering Works Crane complete with controls for 230 volt DC operation. Span: 66'6"; Lift: 25'. Clearance required (top of rail to lowest point of obstruction) 70".

Address replies to: C. H. Wheeler Mfg. Co., 19th and Lehigh Avenue, Philadelphia 32, Pa. Attn: Mr. Albert J. Collet

WANT TO BUY

Steel By-Products Discs

2" to 2½"	Dia.	.060 to .125
4½"	Dia.	.060 to .125
6½" to 10"	Dia.	.060 to .125
11" to 12½"	Dia.	.085 to .095

Hot or Cold Rolled

KEYSTONE LAMP MFG. CORP.

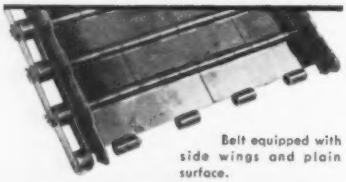
Purchasing Department

Tel. Slatington, Pa. PO 7-3821

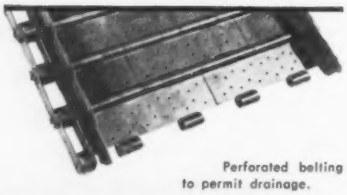
MAY-FRAN HINGED-STEEL CONVEYOR SYSTEM SOLVES ANOTHER PARTS AND SCRAP HANDLING PROBLEM

PHOTO: In this automotive plant, two May-Fran hinged-steel conveyors are utilized to speed production and clear scrap from the working area. Scrap is taken from under floor area and carried to chute where it crosses belt carrying semi-finished parts. Combination chute and storage unit discharges load only when tote box is in position.

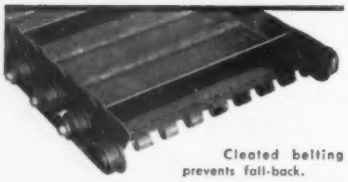
8714-MF



Belt equipped with side wings and plain surface.



Perforated belting to permit drainage.



Cleated belting prevents fall-back.

Pre-engineered for maintenance-free operation, maximum economy and long service life, the May-Fran hinged-steel belting has been developed especially for handling all types of heavy and rough materials. This belting is available in any width or length to meet individual job requirements. CUSTOMIZED conveyors can be supplied from stocked component parts. Installations can be made below floor level, flush with floor or above floor level.

Write today for Catalog MF-100

MAY-FRAN ENGINEERING, INC.
1725 Clarkstone Rd. • Cleveland 12, Ohio

(*Concluded from Page* 165)

part of July. Using a rule of thumb, it's estimated that 1.5 million tons represented purchased scrap.

During July, operating mills and foundries received 559,000 tons of purchased scrap. June receipts by the mills and foundries totaled 2,432,000 tons. Receipts were 1,577,000 tons in July, 1958.

Consumers' stocks reported by operating steel mills and foundries at the end of July were 1,777,000 gross tons. Mills affected by the strike have not reported.

At the end of June, steel mill stocks of home and purchased scrap amounted to 6,945,000 tons, and stocks held by foundries and others, 1,242,000 tons, bringing the total consumer stocks to 8,187,000 tons.

Stocks of No. 2 bundles at the end of June were 853,000 tons vs. 563,000 at the end of June, 1958.

Pig Iron . . .

Pig Iron Prices, Page 160

Foundry operators are concerned over the spreading effects of the steel strike. It is cutting into operations of many plants which use castings as well as steel. Hence, the call for castings is starting to suffer. The mushrooming effects of the strike could seriously cut into the demand by foundries for merchant iron.

Foundries are exerting little pressure for iron. While they are operating at a fairly satisfactory rate, their inventories are ample. Most of them are confident they would have no difficulty getting additional supplies if required.

Stocks held by independent iron and steel foundries amounted to 772,000 gross tons of pig iron at the end of July. That is equivalent to a little more than two months' requirements at the July consumption rate of 348,000 tons.

Announcement that the 57 year old Standard Buffalo Foundry Inc. had terminated operations shocked the trade in the Buffalo area. The company's high production costs made it impossible to compete with gray iron foundries in other parts of the country, an official says.

Granite City Steel Co., Granite City, Ill., is constructing a large blast furnace to replace the older of its two stacks.

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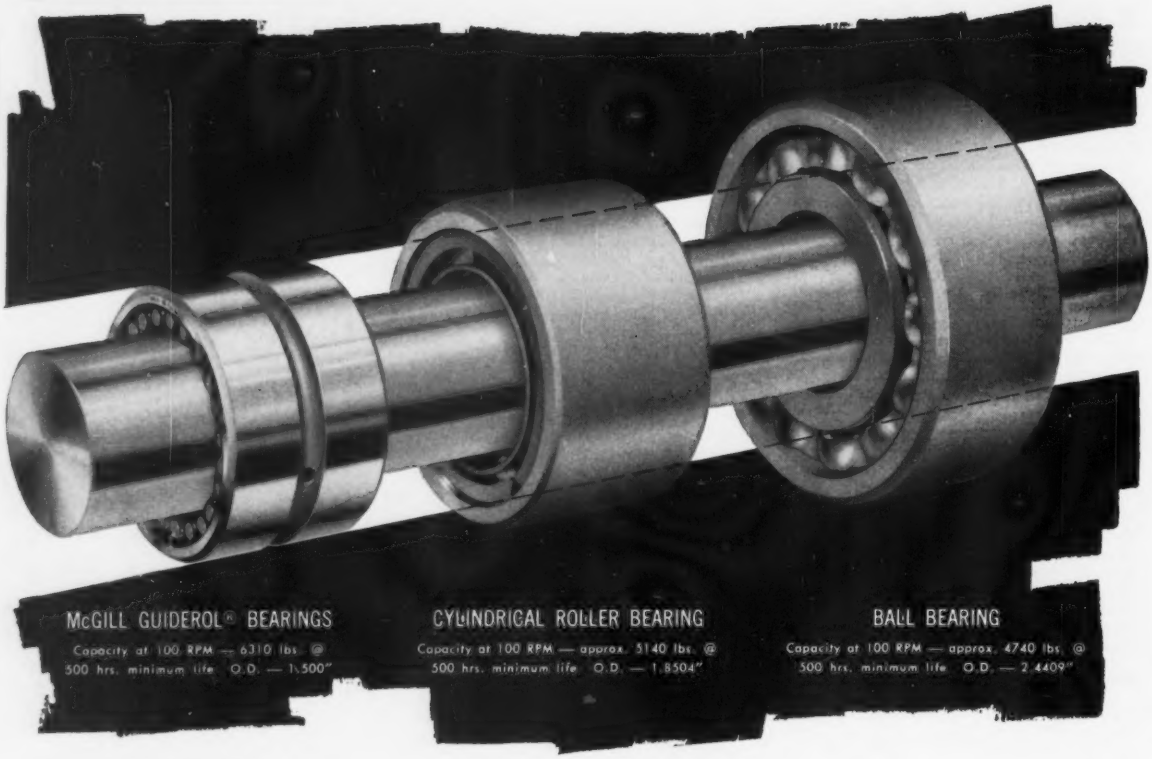
FIND
THE MAN
YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly


McGILL GUIDEROL® BEARINGS
Capacity at 100 RPM — 6310 lbs. @ 500 hrs. minimum life O.D. — 1.500"
CYLINDRICAL ROLLER BEARING
Capacity at 100 RPM — approx. 5140 lbs. @ 500 hrs. minimum life O.D. — 1.8504"
BALL BEARING
Capacity at 100 RPM — approx. 4740 lbs. @ 500 hrs. minimum life O.D. — 2.4409"

GUIDEROL® BEARINGS SAVE RADIAL SPACE

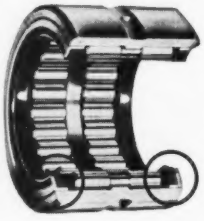
.....and still offer greater load capacity

This graphic illustration demonstrates the radial space saving advantages of McGill GUIDEROL bearings that offer still greater capacity than the other two types of bearing compared. For a common 1" shaft, the GUIDEROL bearing GR-16 has an O.D. of only 1½" with a capacity of 6310 lbs. Compared to a cylindrical type roller bearing the GUIDEROL bearing requires ⅜" less housing space and offers 23% more capacity. A ball bearing for the same shaft uses almost an inch larger O.D. to carry 1500 lbs. less radial load.

CENTER GUIDED ROLLERS

GUIDEROL bearings pack more performance into smaller radial space. Their construction offers the inherent high capacity of a full complement needle bearing combined with effective roller control. Center guided rollers limit roller skewing tendencies and prevent binding under adverse conditions in either horizontal or vertical mountings. This qualifies GUIDEROL bearings for applications which are too heavily loaded for retainer type needle bearings, but are subject to misalignment that precludes the use of unguided needle bearings. Standard GR series GUIDEROL bearings are available, with or without inners, in shaft sizes from ⅝" to 9¼" with capacities ranging from 2880 lbs. to 128,670 lbs. (at 100 RPM).

LUBRICATION LOCKED IN, CONTAMINATION OUT; IN SEALED GUIDEROL BEARINGS



Pre-lubricated and sealed SG series GUIDEROL bearings are interchangeable dimensionally with standard GR series GUIDEROL bearings. They offer 5 possible seal combinations. Specify the sealed bearings for applications that are exposed to dust, dirt, grit or where accessibility for lubrication is a problem. Your McGill representative will be happy to assist you with special application problems. Ask him for recommendations or write the McGill Engineering Department.

For Complete Data on Dimensions, Capacities and Application of McGill Precision Needle Bearings, Send for Free Catalog No. 52A.

engineered electrical products

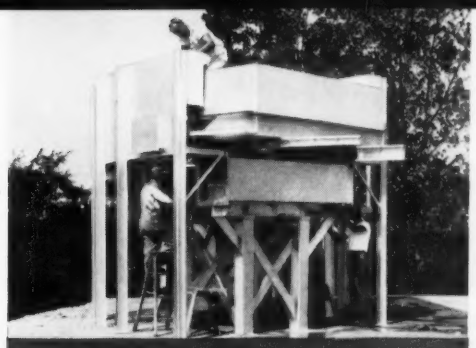
McGILL®

precision needle roller bearings

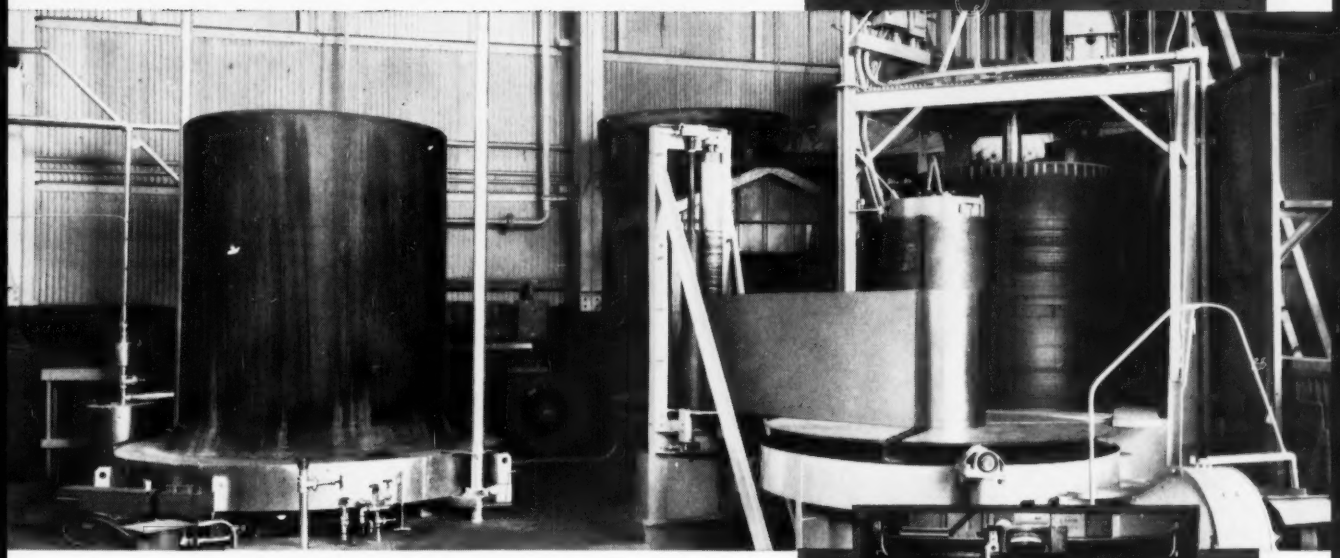
McGILL MANUFACTURING COMPANY, INC., BEARING DIV., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

RESEARCH IN DEPTH...

keeps Lee Wilson first in annealing



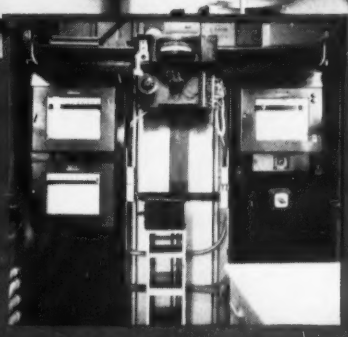
Full-scale wooden mock-up of two sections of the eight-zone new Lee Wilson Rotary Opened Coil Annealing Furnace enables Lee Wilson engineers to study design and construction details.



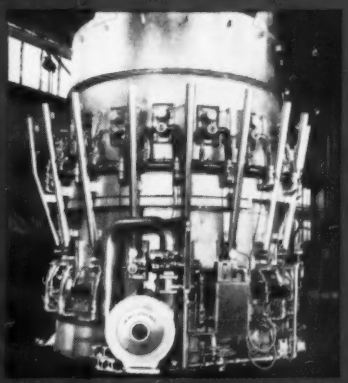
Typical scene at Lee Wilson Research Center shows test coil (on the right) being tight-wound for temper rolling after annealing; on the left, an inner cover over a test charge being purged.

Research in depth keeps Lee Wilson the first name in advanced annealing techniques and equipment. Here is shown a part of the full-scale experimental equipment built by Lee Wilson engineers to thoroughly test the new *opened coil method* of annealing under actual operating conditions. Such extensive research facilities aid in the design and construction of better equipment and enable steelmakers to test their products in this new equipment. The world's leading steelmakers have sent silicon, tin plate and carbon coils to the Lee Wilson Research Center for thorough annealing tests. Full-size coils of many different analyses have been annealed in this opened coil pilot plant with exceptional results.

It is this kind of "beyond-the-drawing board" effort that is the secret behind the advanced design and dependability of Lee Wilson annealing equipment. If you want concrete evidence of what the world's most highly developed annealing techniques can do for your product, why not arrange now for a coil test.



Extensive temperature and recording installation to make permanent records of every test.



Full-scale production furnace for annealing opened coils.

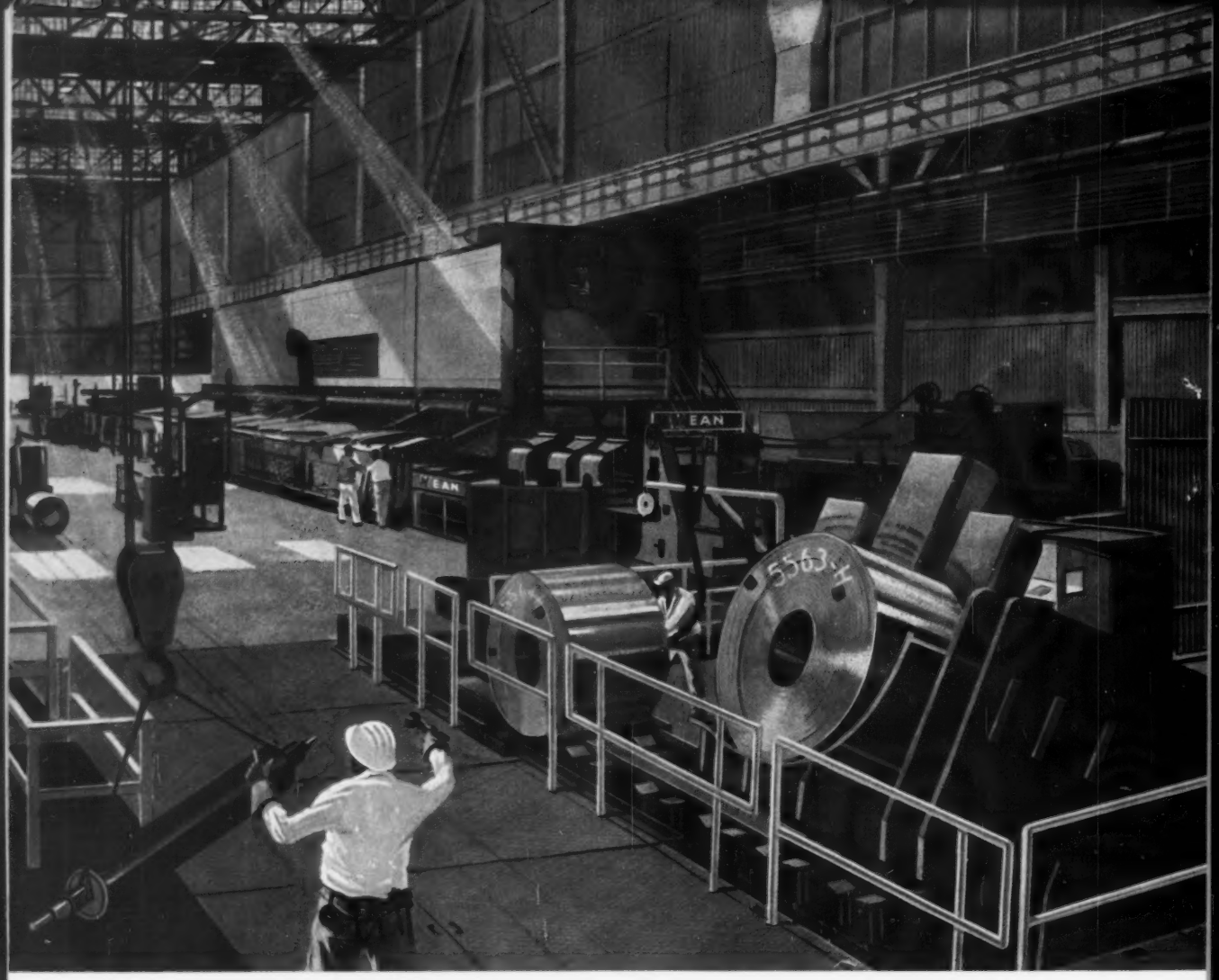
Lee Wilson® ENGINEERING COMPANY, INC.

20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

HIGH PRODUCTION ANNEALING SYSTEMS

MAKE THE BEST METALS BETTER

® ORIGINATORS AND LEADING PRODUCERS OF OPENED COIL AND SINGLE STACK FURNACES



Continuous Electrolytic Cleaning Line, Indiana Harbor Works, Inland Steel Company

Wean, Inland and Cleaning . . .

Operating at speeds up to 2500 fpm, this Wean tension-type, electrolytic cleaning line has replaced two older washer lines at the Indiana Harbor Works of Inland Steel. It employs grid-to-grid application of electrolytic current to the strip for efficient removal of oil and residue resulting from cold reduction. The line handles coils 18" to 42" in width and weighing up to 40.000 pounds.

Of all electrolytic cleaning lines in use today, 80% have been built by Wean, leader in the design and construction of all types of coil processing lines. If you are planning to expand or modernize your sheet, strip, or tin plate finishing facilities, Wean's *creative engineering* can mean important savings to you.

THE WEAN ENGINEERING COMPANY, INC. · WARREN · OHIO